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Contribution of Statistics to the Prevention of Blindness

Joint Session with the American Foundation for the Blind

Chairman, Ralph G. Hurlin, Ph.D., Director of the Department of Statistics, Russell Sage Foundation

CHAIRMAN HURLIN: I have no intention of making any speeches as chairman of this meeting. I should just like to call your attention to the fact that the program this morning is built around the work of the Committee on Statistics of the Blind.

About four or five years ago, while preparations were being made for the taking of the census of 1930 by the Federal Census Bureau, a conference was called in the offices of the American Foundation for the Blind. It was jointly sponsored by the Foundation and by the National Society for the Prevention of Blindness. That conference was primarily concerned with the question, "Should the Census Bureau continue to attempt to count the blind, providing the basic statistics as to the number of blind and some of their social characteristics?" The conference went on to discuss other aspects of statistics of the blind and of blindness and, as a result, a resolution was passed that a committee be established to work in this field. That Committee, sponsored by the two organizations, was appointed and has been working consistently during the past four or five years. The Committee has not made a great deal of noise but has accomplished, I believe, some very real results. The work is by no means concluded, but enough has been accomplished to talk about, and some members of the Committee are taking the opportunity this morning of selling their wares.

As committees go, I think this one would rate description as hard-working, and I believe that almost all the members of the Committee have kept closely in touch with the program and have been contributing consistently to its work. But, of the seven or eight members of the Committee, perhaps the two hardest workers

are the two members of the staffs of the respective organizations already mentioned. One of them, Miss Kerby, statistician of the National Society, is to present the first paper.

A Plan for Standardization of Statistics of the Blind

C. Edith Kerby

Even if trained statisticians were available to take over the entire burden of records and reports from workers for the blind and the prevention of blindness, it is doubtful if they should do so. Records are an important working tool for the physician, social worker and vocational adviser in their services to the blind. They are precision instruments as important in their way as the ophthalmoscope, vision test charts, etc.

Unfortunately it is only too true that the average person believes the doing of a job to be quite unrelated to the record of it. Only when the physician or case worker finds himself at a loss to carry on with a patient for whom his predecessor has left no records, or when some tragic mistake of omission or commission occurs, does the significance of the record as a working tool become apparent. Likewise, the conscientious worker frequently becomes so absorbed in the problems of individual cases that he finds little time to stand off and view the work as a whole, to consider new methods and objectives in the light of the past.

Side by side with this antipathy to anything which bears the label "statistics," there exists a demand for more definite information, more systematic methods of procedure. It was in answer to this demand that the Committee on Statistics of the Blind came into existence.

Over and over again workers for the blind and prevention workers asked such questions as "How many blind persons are there in the United States? What are the most important causes of blindness?" Research workers having access to libraries and files of reports searched for the answers to these questions and found, not a complete absence of information but, which is worse, contradictory information. Even the most complete and, presumably,

the most authentic source—the decennial reports compiled by the United States Bureau of the Census—gave unsatisfactory information on these important points. The Bureau's statisticians recognized that their enumeration of 1920 was incomplete. They estimated that the total number of cases reported was probably one-third less than the true figure, and had no way of knowing whether the characteristics of the group reporting would be true of the blind population as a whole. Certain state commissions for the blind estimated that the census total was probably only one-half the true figure for their states.

Again, concerning causes of blindness, the census could give only data based on the statements made by the blind persons themselves, instead of the reports of ophthalmological examinations. On the latter subject a few state commissions had compiled some ophthalmological findings, but no two had summarized their data in the same way, and, hence, totals or comparisons were not possible. On other subjects, also, information, for the most part, was found to be inconsistent, inadequate, or even completely lacking.

This was the situation in 1929. About that time it became evident that much of the difficulty was due to differences in definition and classification. The net result was that very few organizations were presenting the valuable information in their files in a form to make it available for guidance.

A special conference was called by the American Foundation for the Blind and the National Society for the Prevention of Blindness to discuss methods of improving statistics on blindness, as a result of which the Committee on Statistics of the Blind was created in 1930. It was charged with the responsibility of standardizing definitions, classifications, methods, etc. The Committee represents ophthalmologists, workers for the blind and for prevention of blindness, and social statisticians. It is sponsored and financed jointly by the American Foundation for the Blind and the National Society for the Prevention of Blindness.

The membership of the Committee on Statistics of the Blind is as follows:

Conrad Berens, M.D., member, ophthalmological section of the National Conference on Nomenclature of Disease

Lewis H. Carris, managing director, National Society for the Prevention of Blindness (*ex officio*)
Ralph G. Hurlin, Ph.D., director, Department of Statistics, Russell Sage Foundation (chairman)
Robert B. Irwin, executive director, American Foundation for the Blind (*ex officio*)
C. Edith Kerby, statistician, National Society for the Prevention of Blindness
Evelyn C. McKay, research agent, American Foundation for the Blind (secretary)
Bennet Mead, formerly of the United States Bureau of the Census
B. Franklin Royer, M.D., secretary, Committee on Conservation of Vision, State and Provincial Health Authorities of North America
Stetson K. Ryan, secretary, Connecticut Board of Education of the Blind

On medical matters the members have worked in close co-operation with ophthalmologists. At the last meeting of the American Medical Association, a special committee of ophthalmologists (of which Dr. Holloway is chairman) was designated to co-operate with the Committee on Statistics of the Blind. Likewise, workers for the blind have been freely consulted on problems, as individuals and as members of the three national organizations representing work for the blind (American Association of Instructors of the Blind, American Association of Workers for the Blind and the Conference of State Commissions and Associations for the Blind).

Before proceeding with a summary of the work of the Committee on Statistics of the Blind to date, it must be noted that, for the present at least, the Bureau of the Census has discontinued its special studies of facts relating to the blind. In 1930 the Bureau made only the simple counts of cases enumerated at the time of the regular decennial census. It is quite possible that we may never return to the wholesale and impersonal methods of the census; at least, not if we find that more reliable information is secured by placing the entire responsibility for providing necessary statistical data for guidance upon workers in our field.

The first task of the Committee was to decide upon a list of items on which information would be obtained. It was recognized

that the specialized functions of various agencies working with the blind sometimes make it necessary for these organizations to include certain data which would not have general interest or application. The Committee, therefore, recommended only the following minimum list of items to be included on case records of all organizations:

Name
Address
Sex
Date of birth
Country (or state) of birth
Marital status (single, married, divorced, widowed)
Race (White, Negro, Indian, Chinese, Japanese, Mexican)
Degree of visual handicap
Age at loss of sight
Cause of loss of sight (standard list)
Other members of family blind: if so, specify (blood relatives only)
Raised type used (specify)
Last occupation before blindness
Present occupation
Outdoor relief (financial) from public or private agency
If in institution, specify.

An additional list of items was suggested as valuable but not recommended for tabulation at the present time. These are:

Religion
Extent of education, before and after blindness (grade school, high school, college, vocational school, school for the blind, other)
Previous occupations (complete list of jobs held)
Earnings
Hours of work
Self-support (full, partial, etc.)
Handicap other than blindness

In considering the individual items on the list it was recognized that it would not be satisfactory merely to suggest the subject on which information was essential. Since uniformity and comparability of data were the aim, it was essential to decide upon the nature of detail that would be desirable, and to determine in advance the

classifications under which the data would be tabulated. These standard classification schemes became part of the Committee's recommendations.

A tentative plan for a statistical card, including all required items and accompanied by an instruction sheet indicating how entries are to be made, is among the schemes which have been worked out recently. The form is to be given a trial use by one of the state organizations which has volunteered to do this before the form is recommended for general use.

Selection of a scheme of classification of data presents little difficulty in the case of many of the required items, since accepted schemes already exist. However, classification groupings were entirely lacking for certain of the items, among which are the very important items on degree of blindness and causes of blindness. For these, the Committee on Statistics of the Blind undertook to evolve suitable classifications.

The development of the classification of causes of blindness illustrates the method of procedure which the Committee has followed in its work. Briefly, the steps were these:

1. Committee members set up a tentative scheme for classifying causes, in which etiology of the eye condition was stressed, and nature and location of the eye affection subordinated.
2. This plan was submitted for criticism to a group of ophthalmologists consisting of all those associated with the National Society for the Prevention of Blindness, either as directors or advisers, and also to the ophthalmological section of the Conference on Nomenclature of Disease, which was discovered to be working on a somewhat similar plan for all diseases.
3. The scheme was presented to the British Prevention of Blindness Committee for criticism and comparison with their own plan.
4. It was tried out on a group of 1,000 cases selected at random from the files of the New York State Division for the Blind, the New York City Lighthouse for the Blind, and the Connecticut Board of Education of the Blind.
5. By incorporating the constructive suggestions which had come out of the trial use and criticisms, a revised scheme was evolved, which calls for a complete cross-classification by etiology and by nature of eye affection.
6. This classification has been formally presented to the oph-

thalmological profession here and abroad by members of our Committee, Dr. Berens and Mr. Carris.

7. The scheme was submitted to the national organizations representing workers for the blind, by Miss McKay, and approved for trial use by them.
8. Through the good offices of the superintendents of state institutions and supervisors of public school classes for the blind, contacts were made by Miss McKay with the examining ophthalmologists. During 1933–34 these physicians supplied eye examination records of 2,702 pupils for classification by the Committee on Statistics of the Blind.
9. Arrangements were made to carry on similar studies for these schools routinely, each year, and to add to the group of schools covered, so that eventually information on all children enrolled in schools for the blind will be complete and available currently.

No compilations of adult cases have been made as yet by the Committee but it is a source of great satisfaction to Committee members to learn that a few organizations, serving groups of adult blind, have undertaken to use the Committee's classifications in making their own studies. I have in mind particularly the plans for the study of pension applications by the Pennsylvania Council for the Blind and the co-operative study of case records being made in New Jersey by the Commission for the Blind and the statistical division of the State Department of Institutions and Agencies. There may be others of which the Committee members have not heard.

The cause classification is subject to some further revision with use but enough has already been done to indicate that it is sound and useful. The main groupings used in the classification will become apparent in Dr. Holloway's discussion of the statistics, compiled by the Committee, on causes of blindness among children.

While the classification of causes of blindness and its application in statistical studies have consumed a major portion of the Committee's time to date, the solution of other problems has also received attention.

Among the problems of paramount importance is that of finding a satisfactory definition of blindness. On this one point alone there has been, perhaps, more disagreement among agencies for the blind than on any other subject. The Committee was aware

that other groups had worked on this problem before it, and that its solution was complicated by the fact that many of the definitions in use had been written into state laws. Having determined that absolute agreement was practically unattainable and possibly undesirable, the Committee recommended that "the blind" be divided into several groups, graded by the amount of visual perception remaining. It was felt that, if summaries of case data were presented by these groupings, we could not only tell at a glance the groups covered by each agency but we could also make totals and comparisons which are statistically sound. The vision groupings selected were intended to indicate differences which have a real significance in determining the tasks which an individual can perform. The classification has still to be scientifically tested. The five groups as they appear on the tentative schedule are:

Group	Description of Group	Snellen Measurements—(feet)
1	Totally blind or having "light perception" only	0 up to but not including 2/200
2	Having "motion perception" and "form perception"	2/200 up to but not including 5/200
3	Having "traveling sight"	5/200 up to but not including 10/200
4	Able to read large headlines	10/200 up to but not including 20/200
5	"Borderline" cases	20/200 or more but not sufficient for use in an occupation or activity for which eyesight is essential

One advantage of this type of classification is that it can be extended to include one or more groupings covering those with seriously defective vision who are not blind, but about whom we may wish to tabulate the same type of statistical items. For example, it would be highly desirable to make a study of causes of eye difficulty in defective vision cases, using the same cause classification in order that the two groups might be compared.

Another problem on which the Committee has worked is the development of a simple form to be used by the examining ophthalmologist in reporting his medical findings and recommendations to the agency for the blind. It became evident that such a

standard form would be necessary when it was discovered, first, that many agencies were relying upon the physicians to supply whatever information as to diagnosis they wished to give, and, second, that some organizations had special report forms which did not call for the information which the Committee on Statistics of the Blind was planning to tabulate. The form is not designed to serve the purpose of the case record used by the physician in his office or clinic, but is intended to give the agency a minimum of medical information which it requires for intelligent service to the individual and for statistical purposes. The forms may be purchased from the American Foundation for the Blind or, where an organization requires still further diagnostic detail, the items of the Committee on Statistics of the Blind form can be incorporated in the more elaborate form of that agency.

One of the earliest activities undertaken by the Committee on Statistics of the Blind was concerned with the problem of determining the number of blind persons in any area. As mentioned above, it was well known that the counts of the census were incomplete. The registers of the blind kept by state commissions for the blind seemed more complete but, since they tended to include only individuals eligible for the particular services offered by the commissions, it was felt that they could not be assumed to be 100 per cent complete, unless or until they had been checked. Hence, an intensive survey seemed desirable.

In his capacity as executive of a state commission, one of our members, Mr. Ryan, volunteered to make a special census in two areas in his state, using several methods of case finding suggested by committee members. The resulting register was checked against the United States Bureau of Census' returns for the same areas, in an effort to discover the types of cases formerly missed and the most effective methods of case finding. In part of his North Carolina surveys, Mr. Hayes, of the American Foundation for the Blind, used a house-to-house-visit method suggested by the Committee on Statistics of the Blind. In the recent Brooklyn survey, which was made under the direction of the New York State Division for the Blind, somewhat different methods were employed. From the reports of these surveys, sufficient information is available to indicate that periodic case-finding surveys are

needed to keep registers up to date. This is essential if statistics are to be complete even for limited areas.

From this presentation of the major activities of the Committee on Statistics of the Blind, it is seen that the chief result of the work to date has been to produce a set of standards for the collection and classification of information concerning the blind. As will be apparent from the reports of our other speakers, a beginning has been made in the next steps, which are (1) to gather data on essential medical and social facts for statistical summary and analysis, and (2) to make such application of the data as the findings indicate.

We cannot emphasize too strongly the fact that in the future, as in the past, the success of this undertaking will depend upon the active co-operation of all workers concerned in the two allied fields of prevention of blindness and work for the blind. For, as Dr. Jackson has so aptly stated it, "Advances in knowledge and achievement are brought about by observing, correlating and using facts. We must have more accurate, explicit and reliable statistics of blindness as it now exists in our country."

There can be little doubt that if the statistical program is successfully carried out we shall have the necessary guides for bringing a new and square deal to an important group of the handicapped—those with defective vision.

CHAIRMAN HURLIN: I think you will see from Miss Kerby's paper that the Committee has been attempting to cover numerous aspects of the problem of the production of tools and the sharpening of the tools we already have for dealing with facts concerning the blind and the prevention of blindness.

The next speaker, Dr. Holloway, of the Overbrook School, is not a member of the Committee but has been very instrumental in helping the Committee on one particular phase of its work, and has made use of some of the data that have been produced by the Committee, particularly by Miss Kerby and Miss McKay, on causes of blindness. Dr. Holloway, I think, made his school records available to the Committee, his being the first school in which the new scheme for classification of the blind by the standard list of causes was tried.

The New Statistics on Causes of Blindness Among Children

Thomas B. Holloway, M.D.

It seems proper at the onset of my remarks to call attention to the fact that if we eliminate the congenital conditions, the various refractive errors, direct contamination of the ocular structures, trauma, including radiant energy, and the various types of tumors, all of the remaining diseases of the eyes are dependent upon pathologic changes affecting adjacent or distant parts or organs. It might be added also that a definite percentage of ocular tumors are metastatic. The fact that so many of the pathologic processes encountered in ophthalmology are secondary explains why it is frequently essential to refer our patients to those practicing other branches of medicine. In other words, we are not content to treat what may be but a local manifestation of a remote pathologic focus or of a systemic disease, but we attempt to eliminate the exciting cause. Could this be definitely and positively determined in each instance, the accumulated statistics available at every ophthalmic center would be invaluable in the course of a few years in pointing out the incidence of ocular affection resulting from the various local or systemic diseases. Needless to say, there are many deterring factors at the present time that prevent us from achieving the ideal objective in many instances, but much of the advancement in modern medicine has been brought about by such comprehensive and correlating studies.

The Committee on Statistics for the Blind, in its approach to a classification for the causes of blindness, has included, very properly and wisely, in this study an etiological as well as a topographical classification, hoping that the ultimate results may indicate the direction in which its efforts may be best expended to subserve the primary objective, namely, the prevention of blindness.

But the inclusion of an etiological classification serves still another purpose in that it places before the numerous non-medical workers allied with our various societies and organizations a list of possible affections that may produce serious ocular diseases, and they in turn pass on such information to the laity. In other words, it will serve as a method of education which, in my opinion, is the

most important factor of all in the matter of prevention of disease. But this education must be of the type that can be understood and it must be persistent, for there is a rapid turnover in the material presented for education. On the other hand, I believe the etiological data will be much more difficult to elicit and likewise will be less reliable than the data pertaining to the topographical classification. What is more, I believe it will be less reliable than similar data obtained at most of the ophthalmic centers where a permanent group of physicians would be acting as the correlating agents. But none of these statements should detract from the classification attempted and the splendid efforts so far exerted in its accomplishment; whatever we obtain will be better than what we have at our disposal at the present time.

Naturally, in attempting such a classification, attention would be directed first towards the schools for the blind. It must be remembered that the incidence for the various causes of blindness will be found to vary somewhat according to the locations of these schools, but I do not believe as greatly as this would pertain to the causes of blindness acquired in adult life, where, for example, trauma should show a wide variation in the industrial sections of the country as compared with the agricultural sections. Several factors pertinent to the schools will have a direct bearing on the importance and accuracy of these statistics. First, the character or amount of data on the application blanks necessarily will have a direct bearing on the etiology. At Overbrook we have made a complete revision of our application blank which will include one part pertinent to the education of the child, a second part which pertains to general medical inquiries, and a third part applicable to the eye alone. Further, it will be required that each applicant shall be examined before his admission by a physician who is an eye specialist. This may serve as an incentive to certain other schools to make similar revisions when the opportunity affords. As for our revised application blanks, the information requested or demanded will groove satisfactorily with the requirements of the Committee on Statistics of the Blind, as well as those of the administrators of the pension fund for the blind, which fund became operative in Pennsylvania during the present year. It is probable that with the revisions already made, certain letters of inquiry to

physicians or hospitals may be necessary to obtain the required data. Even then it is possible that in certain instances no reliable data will be obtained and the ultimate decision depends upon the judgment of the attending ophthalmologist. The ophthalmic background of the physician responsible for the examinations at the schools will have a bearing on the statistics under discussion. Moreover, it must be realized that in all schools for the blind there is a definite percentage of students whose intelligence quotients are below the average (at Overbrook the dull, backward and feeble-minded groups total 43.7 per cent, and 8.7 per cent of the total number in the school are probably feeble-minded). Naturally such children are difficult for subjective testing and for some types of objective tests. As a rule the external examinations can be made fairly satisfactorily, but even these examinations are impossible or quite unsatisfactory, in certain instances, for some months at a time. The only way some of these children could be examined satisfactorily would be to etherize them and that procedure we never resort to. Finally, when the interior of the eye is examined, one is attempting to look through a constantly moving pupil at a similarly moving object, for practically all of these eyes with great impairment of vision, or in eyes totally blind, have the so-called searching movements associated with nystagmus. As a consequence, it frequently requires painstaking and persistent efforts to get even a passing view of certain structures within the eye and there is no opportunity for protracted study of the details of the eye-ground, such as is the case in normal eyes.

Naturally, clinical and ophthalmological experience will determine the final classification of certain cases, especially where the etiological data may be deficient or even wanting. It must be remembered that the physician is confined to the data presented and seldom has an opportunity to interview the parents. Even in certain instances where the etiological factors are available, the clinical conditions found might make the statements as to the assigned cause seem highly improbable. Finally, in a case with an accurately assigned cause, two thoroughly competent physicians might differ as to the condition really responsible for the blindness, for it must be remembered that in many of these eyes several

serious conditions may be present, and any one of them capable of producing blindness or much impaired vision.

Before taking up the discussion of causes of blindness I want to revert to the year 1908 when I first went on duty at the Overbrook School. At that time I found a considerable number of children in the School who had, in my opinion, too much vision for a school for the blind. After consultation with Mr. Burritt, we decided that some visual dividing line was necessary for a proper working guide and we set up a standard of 6/60, or 20/200. As the opportunity presented, those children having better vision than this standard were gradually eliminated. We felt that from a psychological, educational and economic standpoint such a step was justified. As far as I know, this standard has been rather generally adopted, not because it was used by us, but probably because others interested in the same work independently arrived at the same conclusion. The first social service department in Philadelphia was organized in 1907 but, needless to say, for many years after that many of the untrained workers with various charitable organizations seemed to regard the school as a home for blind children, irrespective of any other medical condition that might be associated with the ocular affliction. I am happy to say that the adoption of a definite visual standard and the more widespread recognition of the value of the social service worker have made some of the problems of admission less troublesome.

The amazing thing to me is that the group for which it was not possible to specify the etiology constituted only 9 per cent of the total. It may be difficult to lower these figures in the near future, but doubtless much can be done towards making the etiological classification more accurate.

In considering an etiological classification it is well to remember that the chief causes producing blindness in those of school age are the congenital defects, ophthalmia neonatorum, hereditary syphilis, the exanthematous diseases, trauma (as the result of explosives or play or sport), certain intracranial affections (as meningitis, hydrocephalus and brain tumors), tuberculosis and trachoma.

In considering some of the ocular conditions encountered in schools for the blind let us first refer to the largest group, namely, the congenital and hereditary conditions; the incidence for these is

51.1 per cent. It must be realized that there is a decided tendency for congenital defects in the eye to be multiple. For example, a child may have a microphthalmos, but associated with it there may be a coloboma of the iris and choroid and a defect in the crystalline lens. How is this particular case to be classified topographically? Among the congenital conditions, buphthalmos, hydrophthalmos, or ox eye, as it is sometimes called, is conspicuous. Essentially it is an infantile form of glaucoma, and operative procedures, in my experience, are most unsatisfactory. Aniridia, or that condition of the eye where the iris or colored part of the eye is partially or completely absent, as far as one can see by external examination, is notoriously hereditary and may lead to secondary glaucoma. Albinism, while not infrequently seen, in my experience is not as often associated with the extreme degrees of impairment of vision or actual blindness. In my experience, also, high myopia as seen in a school for the blind is more frequently observed in association with other contributing conditions.

Unfortunately it is difficult to get accurate statistics concerning cataract. Many of these children have been operated on prior to their admission. Was the cataract one of the true congenital types or was it secondary to a keratitis or a disease of the uveal tract, that is, of the iris, ciliary body and choroid? Frequently there is no definite way of determining this. As to congenital cataract, I believe it should be generally known that in most of these cases, despite an absolutely perfect operative result, the vision still remains defective and, in a definite number of children, the best that can be obtained is not sufficient to exclude them from a school for the blind. In other words, in addition to the cataract, the eye may be amblyopic, often without demonstrable changes in the eyeground.

Rosters for schools for the blind, at least in the east, are probably not exempt from the same changes that are occurring in the rosters of our eastern colleges, as far as the increase in the number of Slavic and Italian names is concerned—that is to say, there are fewer British, French, and German names. During the past five to ten years I have been impressed with this change in our roster at Overbrook and have commented upon it on several

TABLE I.—CAUSES OF BLINDNESS—CLASSIFICATION BY ETIOLOGICAL CAUSE*

Cause of Blindness	Number	Per Cent
INFECTIOUS DISEASES	772	28.6
Diphtheria	3	.1
Gonorrhea (excluding O.N.)	6	.2
Measles	24	.9
Meningitis	55	2.0
Ophthalmia neonatorum		
Gonorrheal	82	3.0
Other types, specified	..	..
O. N., not specified	208	7.7
Scarlet fever	6	.2
Septicemia	16	.6
Smallpox	3	.1
Syphilis		
Prenatal	126	4.7
Acquired	..	..
Origin not specified	15	.6
Trachoma	13	.5
Tuberculosis	13	.5
Typhoid fever	1	.1
Other infections, specified	30	1.1
Infections, not specified	171	6.3
TRAUMATIC AND CHEMICAL INJURIES	211	7.8
Non-industrial injuries	..	..
War	..	..
Explosives	..	..
Fireworks	4	.2
Firearms	19	.7
Other explosives, specified	28	1.0
Explosives, not specified	..	..
Play or sport	68	2.5
Household activities	4	.2
Street and traffic accidents	10	.3
Injuries incidental to surgery	1	.05
Birth injuries	4	.2
Other non-industrial injuries, specified	30	1.1
Non-industrial injuries, not specified	22	.8
Industrial injuries and diseases		
Trauma (including burns) specified	1	.05
Industrial diseases (including poison)	..	..
Industrial injury, not specified	..	..
Injuries, not specified	20	.7

Cause of Blindness	Number	Per Cent
TOXIC POISONING (excluding industrial)	2	.1
Tobacco	..	..
Alcohol (ethyl, grain)	..	..
Alcohol (methyl, wood, denatured)	1	.05
Other toxic poisons, not specified	1	.05
NEOPLASMS	58	2.2
NON-INFECTIOUS SYSTEMIC DISEASES	33	1.2
Anemia and other blood diseases	..	..
Diabetes	..	..
Nephritis and other kidney diseases	1	.1
Vascular diseases	..	..
Non-infectious diseases, central nervous system	14	.5
Diseases of pregnancy and childbirth	..	..
Other systemic diseases, specified	13	.4
Systemic diseases, not specified	5	.2
CONGENITAL AND HEREDITARY	1,382	51.1
Prenatal	1,067	39.5
Hereditary and familial	315	11.6
ETIOLOGY NOT SPECIFIED	244	9.0
Unknown to science	4	.1
Undetermined by physician	186	6.9
Not specified	54	2.0
TOTAL—ALL CAUSES	2,702	100.0

* Based on 20 schools and classes for the blind, 1933–34; compiled by Committee on Statistics of the Blind

occasions. Needless to say, these changes would probably apply more particularly to schools in the east, or probably to the New England, Middle Atlantic and North Central States. Further, there has been a vague suggestion, from what brief contacts I have had with these children, that as a group their mentality is inferior to the other children considered as a group. In other words, I believe the intelligence quotients for these children would show a higher percentage in the groups rated below "average," that is, the backward, dull and feeble-minded, taken as a group, for my observations have been too conjectural to warrant an attempt to subdivide the below "average" into grades. I believe this question is important enough from an economic and immigration standpoint to warrant an investigation. Likewise it has seemed to me that there has been an increase in the number of our congenital and hereditary conditions, and I am including here the cases of retinal degeneration; this is but an impression, for up to the present, no statistical study has been made, but one is now in preparation.

Before leaving those ocular conditions classified topographically under "eyeball," reference might be made to the item "disorganized eyeball." Needless to say, these eyes represent the terminal stages of various destructive inflammations of the eyes, where enucleation has not been regarded as necessary or consent for operation has been refused. In the majority of cases, such an eye condition is not due to a congenital factor, but where this factor is present it is probable that buphthalmus and aniridia would be the leading contributors, in each case dependent upon the glaucomatous process.

As to "panophthalmitis and endophthalmitis," these are dependent upon infections from without, ectogenous infections, or infections from within, that is, from certain inflammatory foci elsewhere in the body, endogenous infections.

The corneal group is an interesting and important one constituting 14.4 per cent of the cases. It will be noted that no cases involving the conjunctiva have been included in the topographical classification, doubtless because the severe infections of this membrane produce blindness as the result of involvement of the cornea or the uveal tract. One of the most interesting items in this group

TABLE II.—CAUSES OF BLINDNESS—CLASSIFICATION BY TOPOGRAPHICAL CAUSE*

Cause of Blindness	Number	Per Cent
EYEBALL	838	31.0
Hypertension (glaucoma)	4	.2
Refractive errors		
Myopia	93	3.4
Other refractive errors, specified	51	1.9
Refractive errors, not specified	1	.1
Motor anomalies		
Amblyopia ex anopsia (squint)	9	.3
Other motor anomalies, specified	..	..
Motor anomalies, not specified	..	..
Developmental anomalies and degenerative changes		
Albinism	63	2.3
Anophthalmos (excl. surgical)	9	.3
Megalophthalmos	175	6.5
Microphthalmos	77	2.8
Aniridia	25	.9
Disorganized eyeball	234	8.7
Other devel. and degen. changes, specified	73	2.7
Devel. and degen. changes, not specified	3	.1
Panophthalmitis and endophthalmitis	21	.8
Other affections eyeball, specified	..	..
Affections eyeball, not specified	..	..
CONJUNCTIVA	0	0.0
Conjunctivitis	..	..
Other affections conjunctiva, specified	..	..
Affections conjunctiva, not specified	..	..
CORNEA	389	14.4
Interstitial keratitis	65	2.4
Kerato-conjunctivitis, phlyctenular	12	.4
Keratitis, not specified	14	.5
Ulcerative keratitis	277	10.3
Other affections cornea, specified	21	.8
Affections cornea, not specified	..	..
IRIS AND CILIARY BODY	60	2.2
Iridocyclitis	53	1.9
Iritis	7	.3
Other affections iris and ciliary, specified	..	..
Affections iris and ciliary, not specified	..	..
CRYSTALLINE LENS	461	17.1
Lens opacity (cataract)	423	15.7
Dislocated lens	37	1.4
Other affections of lens, specified	..	..
Affections of lens, not specified	..	..
CHOROID AND RETINA	390	14.4
Choroiditis	50	1.8
Uveitis	90	3.3
Retinitis	10	.4
Disseminated chorioretinitis	138	5.1
Detached retina	9	.3
Retinal hemorrhage	1	.1
Retinal degeneration	81	3.0
Obstruction central artery or vein	..	..
Other affections choroid and retina, specified	11	.4
Affections choroid and retina, not specified	..	..
OPTIC NERVE	453	16.7
Optic atrophy	381	14.0
Optic neuritis	25	.9
Neuroretinitis	41	1.5
Other affections optic nerve, specified	4	.2
Affections optic nerve, not specified	2	.1
VITREOUS HUMOR	6	.3
Intraocular hemorrhage	2	.1
Opacities	3	.1
Other affections vitreous humor, specified	1	.1
MISCELLANEOUS AND ILL-DEFINED	105	3.9
Amblyopia, undefined	41	1.5
Other ill-defined lesions, specified	..	..
Lesions, not specified	64	2.4
TOTAL—ALL CAUSES	2,702	100.0

* Based on 20 schools and classes for the blind, 1933–34; compiled by Committee on Statistics of the Blind.

is phlyctenular kerato-conjunctivitis, which has the lowest incidence. At the present time this is not represented at Overbrook, and, I may add, the severer types of this affection are seldom seen by ophthalmologists in our eye clinics. This statement contrasts with the fact that the disease was more frequently encountered thirty years ago. The improvement has doubtless resulted from the efforts of those interested in the general health and welfare of children and from school medical inspection, when those affected are seen and reported while the disease is in the early stages.

Naturally the "ulcerative keratitis and sequelae" item would be the largest, for here would be included those cases resulting from ophthalmia neonatorum, those due to the other infectious diseases, and likewise a certain number of the traumatic cases.

When we consider ophthalmia neonatorum, it should be remembered that the yearly incidence for this disease at a school for the blind is a decidedly variable one. I have seen it range from 4.8 to 32.8 per cent at Overbrook. As a result, we get a better picture of the incidence when this is determined for periods of about five years. In the twenty-six years I have been associated at Overbrook, I have seen it drop from 32.5 per cent to approximately 15 per cent. It will be recalled that the incidence for pupils entering schools for the blind throughout the United States in 1932–33 was 6.7 per cent. These figures and results are astonishing when we consider the character of the disease, and illustrate what can be done when a well-directed and executed campaign of education is backed by adequate legislation.

If such results are to remain permanent or are to be improved, this campaign must continue, and the fact that this affection is not necessarily due to a venereal disease further emphasized. It is difficult to get definite figures as to the incidence for the gonorrheal type, but I believe the 28 per cent shown in the statistics under discussion is lower than is generally believed. Further, the figures presented to the Committee for statistical purposes are far too variable to be accepted as showing a fair degree of accuracy. We do know that many pus-producing organisms are capable of producing the disease—the same organisms that produce conjunctivitis in adult life—and, in addition to this, certain of these cases, as they occur in general, are doubtless of the inclusion blennorrhoea type.

Thygeson's recent excellent work concerning this last affection should be most helpful.

When we refer to interstitial keratitis, with an incidence of 2.4 per cent, we are approaching another serious condition which, while not as frequently encountered in schools for the blind as ophthalmia neonatorum, is shrouded in even greater difficulties, since it pertains to the domestic situation. Accepting as I do that the vast majority of these cases are caused by prenatal syphilis, it must be remembered that other stigmata of this disease are frequently associated with the ocular affection. In the surviving infants and children with prenatal syphilis, Stokes concedes an incidence for interstitial keratitis of 52 per cent. Further, it must be remembered that no portion of the eye is exempt from the ravages of syphilis and that involvement of the cornea is frequently, and in the severer type usually, accompanied by other ocular manifestations. As far as the cornea is concerned I believe the statistics presented are quite accurate, but whether the incidence for syphilis, 5.3 per cent, is quite as accurate is questionable. I mention this chiefly because I am in ignorance as to whether a routine Wassermann test is made at all of the schools included in this survey. At Overbrook we began these tests in suspicious cases in 1921, but since 1924 this test has been used routinely. Needless to say, I believe it should be part of the routine at every school. But even this test is not infallible in prenatal syphilis for, in the aggregate, only about 66 per cent give a positive reaction; the test becomes less efficient as the child increases in age. The difference in the statistical figures for syphilis, 5.3 per cent, and interstitial keratitis, 2.4 per cent, is made up chiefly of those syphilitic manifestations included under the uveal tract and optic nerve.

As is well known, the National Society for the Prevention of Blindness and the American Social Hygiene Association recently initiated a campaign against prenatal syphilis, and, in doing so, I believe they directed their energies along deserving and much needed concerted efforts. When fully established, this crusade should receive the unstinted support of the medical profession, all allied organizations, and the various agencies for public education. I dare say that to most people the reference to syphilis would be

far less reprehensible than much of the text presented by some of our newspapers and magazines.

A word might be said about trachoma; in the present statistics the incidence is low, 0.5 per cent. Twenty-five to thirty years ago, approximately a million aliens were admitted to this country each year and an annual average of about one thousand cases of trachoma were detected at the port of New York. Our restricted immigration and the efficient foreign service of the U. S. Public Health Service have changed much of this, as can be appreciated by noting that for the year ending June 30, 1933, the number of aliens admitted was 23,068, while at the port of New York but thirteen cases of trachoma were certified. So this question tends to resolve itself into caring for the scattered cases and saturated areas already existing in this country. In other words, with trachoma, as with certain of our other political, social and economic ills, we have enough work to do in setting our own house in order without paying much attention to the foreign conditions.

The uveal tract, to which I have alluded above, is the vascular coat or tract of the eye, made up of the iris, ciliary body and choroid. Therefore, it would include those diseases listed under iritis and iridocyclitis (2.2 per cent), choroiditis (1.8 per cent), uveitis (3.3 per cent) and, I believe, the majority of those cases listed under disseminated chorioretinitis (5.1 per cent). If the last named affection should be included, it would give us a total of 12.4 per cent for the whole tract. This is the tract usually primarily involved as the result of remote pathological processes, in systemic affections such as syphilis and tuberculosis, and, secondarily, after severe corneal ulcerations and operative procedures. Frequently, as seen in schools for the blind, inflammations of this tract, for one cause or another, prevent any view of the posterior part of the eye or eye-ground, when using the ophthalmoscope.

I have just referred to tuberculosis and note the statistical incidence of 0.5 per cent. This seems low, even for the United States, where the incidence of this disease is generally regarded as lower than in Europe. However, it must be said that frequently exhaustive examinations are necessary in certain instances, before a diagnosis of ocular tuberculosis can be made, and further, the eyes of many of these students do not permit of a fundus examination

or may be in the stage referred to above as presenting a disorganized eyeball.

In considering the retina, we include retinitis (0.4 per cent), detachment of the retina (0.3 per cent), and the cases included under retinal degeneration, (3.0 per cent), a total of 3.7 per cent for the inner coat, or what might be called the photographic plate of the eye. A few of the cases of chorioretinitis may possibly belong in this group, but I have included them in the uveal tract group. Doubtless some of the neuroretinitis cases might properly be placed here. The retina, like the other coats of the eye, may be influenced by congenital and hereditary affections. The outstanding item in this group is retinal degeneration. The most frequent type is retinitis pigmentosa, including the less frequently observed retinitis pigmentosa sine pigmento. In addition to these, there are certain allied conditions that could be grouped here. While optic atrophy is frequently associated with retinitis pigmentosa, it is not always present at the time the case is examined.

Retinal detachment is most apt to occur in the higher myopes; trauma, trivial or severe, is usually the exciting cause. Not infrequently in the late stages of buphthalmos, detachment of the retina occurs. Even in the so-called spontaneous cases of detachment, trauma, in the most radical sense, is the initiating factor.

When we consider the optic nerve, the percentage conceded this group, 16.7 per cent, is about equal to that for the crystalline lens, 17.1 per cent. We also find that optic atrophy, with an incidence of 14 per cent, is the affection that ranks next to cataract in the order of frequency. This condition is produced by certain affections of the brain and spinal cord; some are of prenatal syphilitic origin, like juvenile tabes, in which affection the optic nerve is more frequently involved than in the adult type of locomotor ataxia. Included among these various intracranial affections are the various types of brain or intracranial tumors. I well recall the boy who was probably the first student admitted to Overbrook who recovered from a lesion of this type, for I had examined him before and after his operation. Prior to that time, the postpapillitic type of atrophy due to tumor was seldom seen in the schools, for all of these children died. Today, thanks to the advances that have been made in neurosurgery, many of these lives are saved,

and if the children are seen before destructive pressure is made on the visual nerve fibres, many of them recover with an amount of vision that would exclude them from a school for the blind.

Aside from other affections that may cause optic atrophy, it is frequently the result of certain types of retinochoroidal disease, and these cases might be differently classified by ophthalmologists. Here some reference might be made to hereditary optic atrophy, sometimes designated Leber's disease. It is Not a definitely sex-limited disease, and is most frequently transmitted by unaffected females. I agree with Julia Bell that if much progress is to be made against this affection, the sisters of affected males must refrain from marriage.

Concerning the amount of vision found among these students, it is interesting to note that in seven schools the proportion having visual acuity better than 6/60 (20/200) varied between 15.2 and 36.6 per cent of the student body. Most of this group would profit from sight-saving class training. This comment is not made in criticism, for it is probable that many of these students come from sections of the country where such classes do not exist or where it might not be possible to organize them. Concerning the children having vision even better than the standard set for sight-saving class pupils, the obvious inference is that their acceptance as candidates for tactile education seems an injustice to them.

In conclusion, I desire to congratulate the Committee on Statistics of the Blind on the results of their earnest efforts and I sincerely hope that, in the future, better and more available data will be placed at their disposal. When a better job is done I believe this same Committee will do it.

CHAIRMAN HURLIN: I am sure the Committee is grateful to Dr. Holloway for his remarks. The next speaker is known to you all, I am sure: Mr. Irwin, executive director, American Foundation for the Blind.

How Statistics Influence Work for the Blind

Robert B. Irwin

I shall confine my few remarks today to mentioning some of the ways in which the statistics and records developed by the Committee on Statistics of the Blind have affected work for the blind. The records and statistics of the past have been so irregular in nature, that, in a good many cases, they hardly deserved recognition as material on which to build up statistical conclusions.

I am going to speak principally today upon the effect and value of the Committee's statistical work in the schools for the blind, because the schools have been the first agencies for the blind to make use of the blanks and classifications drawn up by the Committee. About half of the blind pupils now under instruction in this country are in schools which are using these blanks and statistical classifications. The rapidity with which the schools have come forward and adapted their examinations and their methods of keeping records so as to fall into a general scheme of statistics-gathering has been very gratifying.

Someone has said, I believe, that statistics are a collection of facts which tell you something you already know. That is not quite true, but there is an element of truth in it so far as a good many of us are concerned. They tell you things which you have had a notion were true, but which you have not been in a position to prove. Statistics, collected as the Committee has outlined, are already giving definite proof which confirms certain ideas that superintendents of schools for the blind have already had and have perhaps given them some additional ideas which they have not had before.

These statistics help the superintendent by giving him a picture of the situation. They help him to compare his school with other schools. They will help him to compare his school today with his school five years from now. Perhaps most valuable of all, from the standpoint of the administrator, they show him where administrative action should be taken and taken as promptly as possible.

The blanks require that an eye examination be made by an eye physician. An outsider unfamiliar with the situation of work for

the blind in this country might be a little surprised to find that schools for the blind have any pupils in them who have not been examined by an eye physician. The number of children who have not had an eye examination by an eye physician is, fortunately, becoming smaller, but a good many of our schools for the blind are receiving children, and are compelled by law to receive them, upon the recommendation of a local doctor who may or may not be an eye physician. The pupil is referred to the school by a local physician in his home town, in some outlying county, perhaps, and the school may or may not have this child examined by an eye physician. The blanks recommended by the Committee, however, require that an eye physician go over the entire student body and make a detailed report on the eye condition of each child, with prognosis and recommendations. In some cases, this has brought out some striking facts, of which the superintendents were formerly only partially aware, and which, when brought out in this way, have really made them see that they must take some action. For instance, in one school, they found forty children whose eye conditions, according to the ophthalmologist's report, could be improved by some kind of treatment. You may have a feeling that a few of the children in your school might have their eye conditions improved, and still you may not do much about it, but when someone points out to you that there are forty children whose sight can be improved, you will not delay longer in doing something about it.

In some cases, pupils with defective vision are sent to schools for the blind upon the order of a judge in some outlying county, not so much because their sight is so defective that they cannot be instructed in the public schools, but because their families have been broken up or some other tragic situation has occurred. Since the local doctor has certified that they are blind, and the social situation is complicated, the superintendent accepts the pupils without question, though he realizes that they have considerable vision. This superintendent may be succeeded by another. He finds children that have been there for a number of years who have considerable vision, but he probably does nothing very much about it because they came there before his time, and he does not want to take drastic action.

As a result of the adoption of these blanks during the past year, in one state, twenty children from the school for the blind have been sent to the public schools because they have too much vision to be properly classified as blind children even by a liberal interpretation of the term "blind."

I want to mention some other by-products of the use of the Physician's Report Form for Eye Examinations:

In one school, seventeen children whose sight was susceptible of improvement were given the necessary treatment or operation, with gratifying results.

In another school, where there had been no eye examinations at all, they have arranged to have all the children examined and hope to include in their next budget the necessary appropriation to put this service on a permanent basis.

The work of the Committee has stimulated a general interest in the collection of standard statistics and also in getting treatment for the children in our schools for the blind, and we are sure that it will eventually result in better teaching for these children because, after all, the amount of vision that a child has should be taken into account in planning his method of instruction.

The application of this system of classification of cases and arranging for eye examinations is not so easy in the case of the adult blind who are served by the state commissions for the blind. Adult clients are scattered over the state, and not only are they not always willing to have their eyes examined, but eye examinations are not easy to arrange. Several of the state departments, however, are taking an interest in the work of this committee on statistics, and some of them have already adopted the standard blanks. We feel certain that in the not distant future the preparation of quite satisfactory comparative statistics will be possible by reason of the fact that information is being gathered in the same way in several different states.

In states where there is a blind relief or blind pension which has some central supervision of its administration, it is not going to be difficult to collect the data called for on these blanks because, when people are applying for special relief that is given to blind people, they have to prove that they are blind. That involves an eye

examination and it is not hard to require that the eye examination be made by a qualified eye physician.

The American people are not statistically-minded. A few of us are interested in collecting statistics and appreciative of the results, but the average American is not much impressed by an array of statistics. However, the American people are interested in individuals, and they will seldom let individuals suffer if the matter is really brought to their attention. The collection of statistics by the use of these blanks and by the carrying out of examinations by eye specialists, we feel confident, is going to result in the restoration of vision to a great many people who are now on the list of the blind. The collection of figures showing the number of people who require eye care at public expense, and the pointing out of individuals who require eye treatment, are going to make it much easier for those in charge of our state departments for the blind to get funds to arrange for this work than it has been in the past.

Chairman Hurlin: Mr. Irwin, who has served on this Committee since it was established, has his feet on the ground; he does not want to support committees to recommend statistics unless something comes of it. It seems to me his own remarks this morning tend to show that, not only directly but indirectly, the preparation of good statistical data may help in work for the blind.

The final paper on the program is by Mr. Carris, whom you all know as managing director of the National Society for the Prevention of Blindness.

Preventing Blindness Through Statistics

Lewis H. Carris

I have been reminded several times during the past weeks when we have been preparing this program of the real reason for the existence of the National Society for the Prevention of Blindness. The aim of the National Society is to prevent blindness. Anything we can do which will save people from a world of darkness is worth doing.

You saw this morning how a committee on statistics of the

blind, such as this, has been able to point out certain activities growing out of the statistical surveys which have already resulted in reduction in the number of children suffering from blindness. This is an accomplishment which would have justified the expenditure of many times the money which has already been expended for the work of the Committee.

It also has done another thing for which Mr. Irwin and I congratulate ourselves. It has produced a definite joint project. We have always realized that while the activities of those who are working for the blind and the activities of those who are working for the prevention of blindness are largely in separate fields, yet there is a slightly overlapping fringe; and this is an example, we hope, of the ability of the two groups to co-operate where there is a common cause.

In presenting a summary of desirable developments in our prevention of blindness program which have been suggested to us by the activities of the Committee on Statistics of the Blind, I trust that I may be pardoned for repeating to some extent items covered by the previous speakers.

First, there should be adequate ophthalmological service for every institution and day school class. Many schools have had no service; in others the services are inadequate. As a prerequisite for such service, we should require that the eye physician meet the best standards of training and ability set up by his own profession, and his appointment be divorced from politics.

In some way, the American public must be educated to meet the needs of blind children, but not on a per capita basis. May I say that any scheme of fund appropriation for the support of schools for the blind which makes it possible to have more funds from the State for a larger enrollment, to some extent makes it just human nature to want a large enrollment in the school? Sometimes we have had reason to believe children are kept in the school when they could work better at home.

The school oculist should pass upon the suitability of applicants. He should, by a careful ophthalmological examination, determine the eye condition responsible for blindness. Through correspondence with physicians in attendance at the time of onset of blindness, or through field investigations by the school nurse or social worker,

he should determine the etiology of the eye condition. He should recommend treatment for improvement of vision wherever possible, carrying through for all children not provided for by private medical service. He should advise and arrange for necessary medical service to supplement eye care, where needed. Arrangements should be made for the proper examination and for the proper treatment. The eye physician connected with the school or institution should advise on the nature of eye work and environmental conditions, such as lighting, to make the best use of the remaining vision without harm to the eyes.

That is stating, rather categorically, the things which seem to me to be advisable for inclusion in the ophthalmological services to the schools themselves.

Then, the work of the physician needs to be supplemented by an adequate social work or public health nursing service attached to or available to the schools. These persons should have a general medical knowledge of high standard and a special knowledge of the eye. We wish that funds were available so that one of the graduates of our courses which are being held in Boston and in St. Louis might show what she could do in adequate social, or rather, medical-social work with a school for the blind. Such work needs to be undertaken.

What are some of these services? Contact with parents of pupils to secure their consent to corrective measures and operations is one of the first needs. Everyone recognizes that the parent in many instances needs to be shown to be convinced. We have not yet reached the advanced position which is taken in New York (and even in New York the law is not applied generally), which makes it possible to take the child from the parents' jurisdiction and to place authority for ordering an operation in the hands of the courts. We still, as a general procedure throughout the United States, must secure the consent of the parents for medical operation or treatment.

As mentioned above, one function of such a worker would be to investigate for the ophthalmologist facts concerning the cause of blindness. This worker would also arrange for examination and treatment of other members of the family, to prevent possible additional cases of blindness. How often it happens that children are admitted to the school for the blind and the fact that the under-

lying cause responsible for the blindness is a family trait is not discovered until too late, or, if it is discovered, there are no adequate services in the school for follow-up in the home. It is necessary to go back into the family and find out whether there are children who, in a few years, will also present themselves as candidates for admission to the school for the blind.

That would make the school for the blind an effective instrument in prevention of blindness, although it might lower potentially the number of children who will come to the school.

Of course, it is perfectly plain, from the figures which have been gathered by this Committee, that there is quite a number of children in schools for the blind throughout the country who should have adequate sight-saving class facilities. It would depend upon the local situation whether the sight-saving class facilities are to be placed in the school for the blind or not. Certainly, if these children, who have better than 20/70 vision, are to be kept in schools for the blind, sighted methods should be used. The National Society believes and has always advocated that those children be educated in public schools, provided that problems in transportation can be worked out, that they can get along with sighted people and that they do not have other problems which would lead them to be classified as blind children.

From some source, probably from the state, the schools should be provided with adequate funds for examination and corrective services. I don't know how it will be handled, or what the practice will be, but it seems to me that this is a specialized type of service in which there could be no objection to the use of state funds to keep people in the sighted world rather than to have them in a world of the blind. In the end, this would represent a real economy, both of money and of human resources.

There is need for further research. The first studies indicate what information is available but do not give satisfactory data on cause, and so forth. Additional information which could be secured through more complete examinations and investigations is needed. For example, let us consider ophthalmia neonatorum: how much of this is of gonorrheal origin and how much from other causes? What is the true syphilis figure? Information is now obscured by lack of diagnostic facilities. By more intensive study, also, the undetermined and indefinitely classified cases might be

cleared up. At least, we should have less and less of the "unknown" in new cases. There is also a very great need for real medical research in congenital blindness. It is not enough to say "born blind"; we must know the cause—syphilis, heredity or whatever the cause may be.

If someone would give us the funds, we should be glad to provide field workers who would work, under the general direction of the National Society for the Prevention of Blindness, to aid each state in its own set-up. I don't think that is going to be possible, but, if funds were available, that is the sort of service we should like to render. At least temporarily, I believe that there should be the greatest possible use made of volunteer services and funds and that there should be demonstration projects in selected areas to show the need and prove the worth of such services. We have already tried to find some funds for such a demonstration service but, so far, without success.

I have not dealt with statistics at all. I have tried to say what I hope, as a practical administrator, will be found of great value in our war against blindness.

Discussion

Mr. Charles A. Hamilton (Batavia, New York): Dr. Holloway's paper brought out very clearly that there were two classes of causes of blindness—etiological and topographical. In reporting from our school, for instance, supposing we have thirty new cases this year, which class of causes is the most valuable to be reported? Shall we say the person is blind through optic atrophy or blind because he had measles? Which class of causes do you want listed?

Miss Kerby: We are asking for both. We are asking, instead of the type of questionnaire which called for having the school make its own classification, that it send us a copy of the physician's report form for each pupil. The cases will be classified in the offices of the Committee, so that we can give cross-classifications.

Mr. Hamilton: You don't care what we report in our annual report?

Miss Kerby: We should like to have some more schools use the etiological classification. If you can give both the etiological and the topographical classifications, you will have solved the problem.

Chairman Hurlin: Isn't the real point, that the classifications which institutions and even some medical people have made in the past, have been neither one nor the other? Some causes have been etiological and some topographical, the result being there is no way in which one can evaluate the data and make comparisons with similar data of other people. Here is offered a standard plan; as Dr. Holloway suggested, it needs further attention, but at least it is a standard plan that will permit different institutions and agencies to compare results and will permit such organizations as this Committee to compile results from different sources. It is highly essential that both types of classification be made.

Dr. Edward Jackson (Denver, Colo.): The report illustrates, perhaps more forcibly than anything else could, the extent and importance of the statistical problem. The American attitude towards statistics may perhaps be characterized by the saying, "Figures do not lie, but liars can figure." Actually, statistics, of themselves, tell neither truth nor falsehood. The vital point upon which we depend in statistics is the basis of observation upon which they are founded. We must depend less on questionnaires and more upon questioners.

When the Federal Government was preparing for the 1930 census, the Colorado Ophthalmological Society asked that all investigations of blindness be followed up by observations by some member of the Society; that eye physicians should be relied on to furnish the ultimate facts for the statistics. The supervisor of the census soon found out by correspondence with Washington that there was no authority in the laws that would enable him to do that in the State of Colorado.

Now is the time to act for the 1940 census, to require that the enumerators report those persons that they find blind, and that cases be made the subject of special investigation by eye physicians, to find out which are blind and what are the causes of blindness. Just those two things would add to the value of the census.

It is just about a year since, through the liberal policy of the Society, we have had a social worker in Colorado. It has taught every one of us who has been interested in the blind the importance of follow-up work.

CHAIRMAN HURLIN: Dr. Royer has been one of the prime movers in this Committee; he started the work on this scheme for standard classification of causes and also the work which hasn't had so much emphasis here today, of devising a scheme for classification by degree of vision which, to my mind, is one degree less important than these other two that we have been talking about.

DR. B. FRANKLIN ROYER (Philadelphia, Pa.): If the managing directors of the two organizations that have sponsored the activities of this Committee have had any doubt prior to today's session as to the wisdom of financing it and of stimulating it, I think any such doubt must have been removed when they listened to the discussion of Miss Kerby and of Dr. Holloway this morning, particularly Dr. Holloway's clear-cut discussion of the reason for setting forth the etiological factors. You must all have recognized that unless you go back to treat the etiological factors, other tragedies may ensue, and you must have recognized that if treatment is not given, such tragedies may occur while the child is before you.

I remember very distinctly, some eight years ago, a discussion before the workers who were teaching the blind, in Atlantic City. Speaking, not from the statistical angle but more or less from the etiological factors, one of the superintendents of one of the schools related his personal observations in his own institution where several children had entered who were definitely blind so far as disorganization of the eyeball was concerned. There was nothing to be done for the eyes, but they had sat idly by, attempting to educate the children when the etiological factor responsible for the blindness kept on functioning. The children lost their hearing because of this same etiological factor—syphilis. That teacher said my remarks were to him a good deal like fastening blame on him; he missed his opportunity, he failed to grasp his duty. He further said that until that time they had not obtained permission from parents to treat any part of a child's system if they suspected such a thing as syphilis. He and those responsible for the management of that institution hadn't any grasp, statistically, of what could be accomplished and what might be accomplished.

I am sure from what was said here today that in dealing with the

blind, whether you are looking to improve their social conditions or their general health and happiness, you will see many opportunities to preserve such small amount of vision as they have, and to preserve their health in general. You must get back to the basic etiologic fault and get all that modern medical science can do to right that particular fault. The farther you go, the more you must be guided by exact statistics and exact interpretation from medical science and, co-ordinating the two, do all that may be done for humanity.

Mr. George F. Meyer (Minneapolis, Minn.): For a number of years I have been interested in the aims and objects of the Committee and in the development of these statistics. I have followed, with a great deal of interest, the correction of the methods used in gathering statistics which would point a way toward a more accurate statement of the causes of blindness. I am glad to see that the Committee has focused its attention not only upon the causes of blindness, but upon the causes of defective vision. I think there is a very definite distinction there. We have been thinking in the past, very largely, in terms of the causes of blindness as they have created the group of children that have been assigned to the schools for the blind.

In the discussion going on here this morning, we have been thinking largely of the group with very low vision yet, by reason of the very much larger number, and by reason of the calamity that defective vision brings upon the individual that is in some respects almost comparable in his social and economic life to some aspects of total blindness, we need to focus our attention quite as much upon the causes of defective vision in the group that is above 20/200. Perhaps then we can interest the public not only in the prevention of blindness by conserving the little vision that some of these people still have, but in preventing the causes that lead to partial vision.

Eliminating Fireworks Accidents*

Joint Session with the American Museum of Safety

Chairman: Arthur Williams, President, American Museum of Safety

CHAIRMAN WILLIAMS: The huge radio audience which the National Broadcasting Company has brought together from coast to coast, and perhaps even some of the doctors, educators, insurance executives and safety officials in this room, are wondering why we come together on the seventh day of December to discuss accidents that occur on the Fourth of July.

Probably the simplest and best answer is to say we are here today to save the lives of scores of children who would otherwise be killed next July. We are here to save the eyes of hundreds of children—and of some grownups—who would otherwise be blinded seven months from today. We are here to save several thousand children from being seriously injured on the next Fourth of July—and on every Fourth of July thereafter.

We are undertaking this life-saving job six months in advance for two important reasons: first, the National Society for the Prevention of Blindness, which has long concerned itself with the prevention of fireworks accidents, has this year made some important discoveries in this field and quite appropriately chose this, one of the sessions of its annual conference, to make these discoveries public; second, to do anything as ambitious as one of our speakers, Mr. Louis Resnick, will propose here today, it is necessary to start at least six months in advance.

Before we ask Mr. Resnick to speak, I want to introduce the man with whom I am sharing the honor of presiding at this historic meeting—for I am sure it will turn out to be historic; he is probably the one man who least needs an introduction to this audience, Lewis H. Carris, managing director of the National Society for the Prevention of Blindness. Mr. Carris is known to some of you as an educator, for he was superintendent of schools before he came

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to this Society some twelve years ago. He is known to others as administrator of a great national health organization concerned with the saving of what most people regard as their most valuable possession, their sight. He is known to still others of us as a generous colleague, for he has personally, and through his able staff, co-operated not only with the American Museum of Safety, but with local, state and national health and safety organizations throughout the country.

Co-operation in Eliminating Fireworks Accidents

Lewis H. Carris

MOST of you who live in the north are probably unfamiliar with the custom of shooting firecrackers during the celebration of the New Year—a custom found in many places in the South, as in New Orleans, for instance, where it is an old and well-observed tradition. In a sense, therefore, it is as timely for us to be discussing this question now as it would be if our conference were held a few weeks before the Fourth of July.

The problem of eliminating or greatly reducing the large number of injuries to children resulting from the widespread and careless use of fireworks is one that concerns not only the National Society for the Prevention of Blindness. Several other organizations, notably the National Safety Council and the American Museum of Safety, have conducted drives for many years in an effort to reduce the death and injury toll of fireworks. The success of any new plan will depend upon the continuous and close co-operation of all the interested groups.

Our efforts to reduce fireworks accidents have heretofore been largely confined to local laws prohibiting their sale, and public warnings concerning the danger to life and limb and to our eyes involved in the use of fireworks. These activities have not accomplished the purpose. I think Mr. Resnick will convince you that fireworks accidents still do a tremendous amount of damage. We need more fundamental methods of getting at this problem.

This Society has concerned itself with the possibility of reducing fireworks accidents in general, on the assumption that as such gene-

ral reduction takes place there is a reduction also in those fireworks accidents which result in serious eye injuries.

We had under way, until recently, the preparation of a so-called model fireworks ordinance through which we hoped fireworks accidents might be reduced. We have come to the conclusion, however, that it is almost as hopeless to try to control this situation by regulating the sale of fireworks at thousands of roadside stands and retail stores as it was to try to enforce prohibition of the sale of liquor. Many of us are becoming convinced that the only hope of effective control of the use of fireworks and, therefore, of fireworks accidents, lies in restricting the sale of fireworks at the source—that is, the factory.

However, it seemed to us desirable to seek the advice and co-operation of the many other agencies which have concerned themselves with efforts to reduce fireworks accidents before advocating such restrictive legislation. That is why we are here today. I am extremely pleased to say there are in this room representatives of practically every organization that has played any important part either in the sight conservation movement or in the general safety movement.

The program before us is not a one-man or one-agency job. The National Society for the Prevention of Blindness can play only a small part in this movement. We have on many occasions in the past enjoyed the co-operation of the organizations represented here and welcome this additional evidence of your interest in our work and in the common problem before all of us.

Chairman Williams: The next speaker possesses a great variety of personalities and records of accomplishments. He still likes to regard himself as a member of the Fourth Estate though it is fifteen years since he was enticed from an editor's desk in the Associated Press to the post of first publicist for the safety movement in this country. As publicity director, first for the National Safety Council, later for the American Museum of Safety, and, more recently, as industrial relations director of the National Society for the Prevention of Blindness, he has probably done as much to make America safety-conscious as any other person in this country. This may come as a surprise to some of the younger

members of the press who happen to know him as spokesman or public relations counsellor for the field of welfare and philanthropy. It may surprise some of the ophthalmologists, insurance executives and sight conservationists here who know him as co-author with Mr. Carris of the book, *Eye Hazards in Industrial Occupations.* However, when you combine all these capacities and records of accomplishments, you get a master of the art of public education. You get a publicist whose tools are not black magic or window dressing, but facts, the ability to unearth them, and the courage to present them, even when they are not always pleasant to face.

The Toll of Fireworks Accidents

Louis Resnick

JUST before I came in here, my very efficient secretary handed me a little note which said, "When statistics failed to convince a certain committee of aldermen, those interested in the bill showed the aldermen a blind child, one with a leg missing, one even more badly mutilated, and this brought action." She was speaking of a meeting at which a fireworks ordinance was considered. I am not going to parade before you all the persons mutilated by fireworks in the city of New York because it would take all afternoon and the radio audience couldn't get the effect because we haven't yet developed television to that point. But let me put to you a few questions which should visualize better than any other way the statistics about which I am going to speak. Some of you may feel these are horrible questions to pose, but we might as well look the facts in the face:

Have you ever seen a child with one eye closed for life?
Have you ever seen a little boy with half his face shot away?
Have you ever seen a little girl in a lacy holiday dress catch fire?
Have you ever heard the cry of a child afire?
Have you ever smelled the odor of burning human flesh?
Have you ever played with a child on your knee in the morning and seen it dead in the afternoon?

That is the sort of thing we are talking about when we talk

about fireworks accidents. Every one of the clippings in your hand represents that kind of a situation. And we have thousands more where those few came from.

In the matter of fireworks accidents, most of us are a good deal like Will Rogers—all we know is what we read in the newspapers. That is why there is a mistaken notion that we have a sane and safe Fourth of July in America and have had sane and safe Independence Day celebrations for many years. For example, on the fifth of July this year, people throughout the country read in the newspapers that this was the safest Fourth in many years and that there had been only one death due to fireworks.

As a matter of fact, the National Society for the Prevention of Blindness has on hand the names of 29 persons who died from fireworks accidents celebrating the Fourth this year. We have on hand the names of more than 2,600 persons who were seriously injured in fireworks accidents during that period, and this, I am convinced, is only an insignificant part of the toll of fireworks casualties this year.

The newspapers themselves are not entirely to blame for this mistaken notion. The trouble is, first, that there is no organization or government department which requires the reporting of fireworks accidents. On top of that, so much to-do has been made over the reduction in the number of accidents that the general impression is that the Fourth of July, as celebrated today, is really a glorious Fourth, in which everybody has a good time and only a few people get their fingers burnt.

Let's see just how safe this last Fourth was.

Here, in New York City, where we have a law prohibiting the sale of fireworks and an excellent Police Department to enforce the law, the hospitals on July 5 this year reported 2,600 casualties from fireworks, or 1,500 more than last year. Of these 2,600, only those few whose names appeared in the newspapers are included in the total of 3,000 for the entire country reported in this Society's survey of fireworks casualties.

New York is no worse in this respect than cities throughout the country. Even a casual reading of the clippings shows that in large numbers of cities in this fifth year of depression, when more than 10,000,000 people are out of work and millions are on relief,

the toll of fireworks accidents was greater than in many previous years.

The situation about the country as a whole is, perhaps, best described by a paragraph which appeared in *The Philadelphia Public Ledger* on July 5: "While Philadelphia and nearby sections today counted a toll of nearly 300 fireworks casualties, making this year's Independence Day celebration the most disastrous since the World War, Fire Marshal James O. Mulhern called the day 'the quietest and nicest Fourth of July in the history of the Fire Marshal's office.' "

This statement will come as a surprise to those few in the audience who, several weeks ago, attended a private conference called by this Society in which it was said that no fireworks accidents had been reported from Philadelphia either this year or in a similar inquiry several years ago. A number of the representatives of safety organizations present on that occasion thought here was a solution of the problem—thoroughgoing local enforcement.

An analysis of newspaper reports of fireworks accidents during the two weeks preceding and the two weeks following the Fourth of July, made several years ago by the National Society for the Prevention of Blindness and the American Museum of Safety, showed—

> that 161 persons had been killed by fireworks,
> that 52 of them were children less than 5 years of age,
> that 54 burned to death when their clothing was ignited by fireworks or bonfires,
> that 20 children were burned to death by "harmless sparklers,"
> that 21 children died as the result of eating fireworks,
> that 32 persons were shot by "unloaded guns" or stray bullets,
> that 30 persons lost one or both eyes,
> that 300 others suffered eye injuries,
> that 1,900 persons were otherwise injured.

All of this with ten states not heard from at all.

Personally, I am convinced that if a thoroughgoing check were made of fireworks casualties this year, or in any recent year, it would be found that the situation is practically as bad as it has ever been.

How bad is that? I will let you judge for yourselves. The Fourth of July, you know, commemorates our independence acquired in the Revolutionary War. The *World Almanac* tells us that 4,044 Americans were killed in that war and that 6,004 Americans were injured.

As against this, in the last 30 years alone, 4,290 Americans were killed in fireworks accidents, and 96,000 Americans were injured in fireworks accidents.

And this does not include the many deaths which occur long after the Fourth of July as a result of injuries received on the Fourth; it does not include the drownings and automobile fatalities which regularly occur on the Fourth of July.

To cap the mistaken notion that we already have a reasonably safe and sane Fourth, there appeared in newspapers throughout the country recently a dispatch from Washington which had led many people to believe that in the future the danger of accidents from fireworks would be altogether removed. Let me read you a few lines from this statement:

> Washington, Aug. 27.—The "riot" has almost entirely been eliminated from "patriot" for the American boy as a result of an agreement of manufacturers of firecrackers with the NRA today, by which magnesium and aluminum, the elements often productive of accidents, will no longer be used in the manufacture of firecrackers sold in this country.
>
> The parties to the code agreed specifically that production and sale of fireworks containing magnesium or aluminum, which assists the explosion, should be declared an unfair trade practice.
>
> There will be plenty of sound in the firecrackers made hereafter, the NRA promised, but the likelihood of serious consequences from their use will be largely eliminated.

I am sorry to say that after a conference with doctors, safety engineers, and chemists, I am convinced that this NRA agreement with the manufacturers of fireworks will not in the least solve the fireworks accident problem.

What the dispatch from Washington did not say was that aluminum and magnesium are more expensive than the black powder that is now being used in fireworks and that, probably, is why the manufacturers agreed to eliminate them. They admit

the new fireworks will have a bang. To have a bang, you must have an explosion, and so long as you allow children to play with explosives you will have serious fireworks accidents.

Now what is the solution, if any? Until recently—as Mr. Carris explained—we thought the model ordinance was the solution, but when we began to check the cities from which long lists of casualties are reported each Fourth of July against the cities having fireworks ordinances, we found that practically as many accidents occurred in cities having ordinances as in cities not having any. The reason is simple. In the first place, fireworks are sold in groceries, candy stores, stationery stores, and thousands of other small retail shops; and in any large city it is almost as difficult to enforce the law concerning the sale of fireworks in these small shops as it was to close up the thousands of speakeasies in New York City. In the second place, every city having a fireworks ordinance is surrounded by suburban towns and good roads, which from June 15 until July 5 are thickly populated with roadside stands selling fireworks openly and legally because they are just outside the city limits or, even, village limits. In the Society for the Prevention of Blindness, we have come to the conclusion that the only effective way of keeping fireworks out of the hands of children and others who do not know how to use them would be to regulate the sale of fireworks at their source, the factory. We asked fire chiefs and police chiefs throughout the country what they thought of this point of view, and not one disagreed with it.

We brought together several weeks ago the executives of a dozen or more national safety agencies concerned with this problem and laid before them a statement, somewhat similar to that which appears on this program, as a proposed resolution.* We had almost unanimous agreement with the point of view expressed there, and we had hoped to be able by today to announce the formal adoption of this resolution by the many agencies concerned. There has not, however, been time for all of them to put this question before their various boards and committees and, consequently, the resolution is being circulated among you now, not for action today but as something to think about and discuss with your respective Executive Committees and Boards of Directors.

* This resolution is published on page 46 of this issue.

As Mr. Carris explained, the interest of the National Society for the Prevention of Blindness in this subject is necessarily rather incidental. This is a problem primarily of the organizations devoted to the general subject of safety, and I hope that these organizations, under the leadership of the American Museum of Safety and the National Safety Council, will shortly after today's meeting appoint a joint committee to consider the adoption of this suggested resolution as a program of action. We already have a communication from Franklin H. Wentworth, managing director of the National Fire Protection Association, that his organization has approved the resolution.

I am sure that I am expressing the views of Mr. Carris and of the National Society for the Prevention of Blindness as a whole when I say that if the several national safety organizations undertake such a program as is proposed in this statement, the National Society for the Prevention of Blindness will co-operate to the maximum of its ability. This Society feels that its obligation in this regard is, for the present, fulfilled by the making public of these facts and conclusions—not only our conclusions but those of fire chiefs, police chiefs, and others actively concerned with the prevention of fireworks accidents throughout the country.

For the benefit of the radio audience, chiefly, which hasn't before it the resolution that you have, I should like to read some questions on which the resolution is based, as well as the resolution. These are the questions that the National Society for the Prevention of Blindness this year submitted to police chiefs and fire chiefs throughout the country.

"We are writing now to ask your opinion—not for publication or quotation, but simply for our own guidance—on this matter. Specifically, do you agree with the point of view that complete suppression of the sale of fireworks by grocery stores, candy stores, stationery stores, and other small retail merchants in the city—to say nothing of roadside stands outside the city—is hopeless of attainment?

"Secondly, do you feel that a much greater degree of control of the sale and use of fireworks and, therefore, a greater reduction in the number of fireworks accidents would be obtained through the

limitation of the manufacture and sale of fireworks by the manufacturer to the following consumers:

(a) industrial consumers, such as railroads, steamships, quarries, etc.;
(b) the army and navy departments;
(c) municipal, state or county departments; and
(d) such private individuals as can prove that the fireworks will be exhibited or consumed under the personal supervision of a pyrotechnical expert?"

Just one more word. At this meeting of the executives of the national health and safety organizations, a few weeks ago, when, as I said, most of the elements of the proposed resolution were approved, much emphasis was placed on the need of public education and of securing co-operation from the manufacturers. There has been co-operation from fireworks manufacturers all through these years and there has been a lot of public education. I, myself, have written a piece of educational material in the form of a warning concerning the danger of fireworks every year for the last fifteen or sixteen years. I think both the co-operation of fireworks manufacturers and the campaigns of public education have done some good. I don't think they have done an awful lot of good. I don't believe you are going to save many children from being burned, blinded or mutilated, by the co-operation of manufacturers. I don't think you are going to save them by education alone. I think you need both of those, plus either national or state legislation directed at the factory, not at the consumer. I appreciate that state and federal legislation are exceedingly difficult to get, but that is the cure, if you want it.

Editor's Note.—The resolution on the reduction of accidents from fireworks is herewith presented.

Resolution for the Reduction of Fireworks Accidents

Whereas commemoration of our Independence, through use of fireworks, has resulted in greater loss of life and greater toll of personal injury and property loss than occurred in the winning of this Independence, and

Whereas, despite numerous local ordinances prohibiting sale and use of fireworks and repeated warnings concerning the danger

of accidents from fireworks, children are still being killed by scores and injured by thousands through fireworks accidents each year, and

WHEREAS complete suppression of the sale of fireworks by retail merchants—even in cities having ordinances prohibiting the sale of fireworks—is practically unattainable, and

WHEREAS suppression of the sale of fireworks in cities—if this were possible—would be nullified by the widespread roadside sale of fireworks in suburbs and rural communities adjacent to cities, suppression of which also seems impracticable,

Therefore Be It Resolved by this conference of representatives of national and local agencies concerned with sight saving, public health, and public safety, assembled under the joint auspices of the American Museum of Safety and the National Society for the Prevention of Blindness,

First, that the greatest hope for effective control of the sale and use of fireworks, and a consequent reduction in the number of fireworks casualties, lies in control of the manufacture and sale of fireworks at the source, namely, the factory.

Second, the manufacture and sale of fireworks should accordingly be restricted—through national and state legislation—to the following:

> Army and navy departments of the United States Government;
>
> Railroads, steamship lines, aviation companies, quarries and other industrial or commercial concerns requiring pyrotechnics for the normal conduct of their business;
>
> Federal, state, municipal or county governments, and such incorporated clubs or associations as can guarantee that fireworks will be discharged on their premises under immediate supervision of pyrotechnic experts.

Third, commemoration of Independence Day, through the use of fireworks, firearms and bonfires, should be sharply discouraged, if not altogether discontinued, and in its place there should be developed, through an intensive nation-wide campaign of education, programs of patriotic celebration in which athletic events, pageantry, and other forms of wholesome recreation would eventually eliminate children's desire for the excitement of fireworks, firearms, and bonfires.

CHAIRMAN WILLIAMS: It would be difficult to express our appreciation of the presence here today of one of America's most distinguished sons. My acquaintance with him dates back to his

first year as assemblyman at Albany, when he introduced a bill in the Legislature in reference to electric light wires on the highways of the state. Calling at the Capitol and asking for the author of the bill, I was shown a stripling of striking personality walking down the center aisle of the Assembly Chamber. Introducing myself and telling my mission, I was answered with, "A few days ago a small boy climbed an electric light pole, touched one of the wires and fell to the ground dead. We cannot permit our boys to be killed by you electric light men." My reply was that every electric light man in the state was in full sympathy with the Assemblyman's thought and would co-operate with him to the utmost in the development of his safety plans.

Thus began one of the most treasured friendships of my life.

If that boy's deplorable death was the cause of that young Assemblyman's lifelong devotion to the safety and general welfare of the men and women who work, and their children, that boy did not die in vain. Hundreds of thousands, perhaps millions (for this meeting occurred thirty years ago) of injuries and accidents have been prevented with all the attendant suffering, misery and death, under his guiding genius and inspiration.

Everyone in this great audience, seen and unseen, by this time must know the gentleman of whom I am speaking, one of New York's greatest governors through four administrations, one of the nation's greatest benefactors, the Honorable Alfred E. Smith, who will now address us.

Preventing Fireworks Accidents

Alfred E. Smith

A SITUATION in which children are killed by the score and injured by the thousands in the business of celebrating the fact that this country is a free and independent democracy, and not a colony of England, is a situation which calls for correction and cure, if anyone can produce a prescription for that cure.

Whether the proposed resolution you have in mind is the right prescription, I do not know. I do know, however, that fireworks manufacturers are people. They are fathers and, as such, have

the same human regard for life and for the safety of their own children and other people's children that we all have.

I say, therefore, that if you want to do something new to cut down the annual casualty list due to fireworks accidents, go first of all to the fireworks manufacturers. See how far they will co-operate. You may find they are willing to go farther than you think in substituting carefully organized and expertly supervised exhibitions for the indiscriminate use of fireworks by every Tom, Dick and Harry. That is the first step.

Now, as to more legislation, state or national. There are entirely too many laws on the statute books already. Too many laws are enacted by every state legislature and by every municipal assembly. Nobody knows this better than I do and nobody has said it publicly more often.

But—laws have done a lot of good in the field of safety. They have saved a number of lives and they have saved a lot of misery among the dependents of killed and injured workmen. You can't get away from the fact that it was the Workmen's Compensation Law that really got the safety movement in America started, and I am glad to say I had a strong hand in putting through these laws in the State of New York.

The legislature of this state deserves as much credit as any safety organization for the success of the industrial safety movement and, for the benefit of the radio audience, I will say the same is true of the other big industrial states—Pennsylvania, Ohio, Massachusetts, Illinois, New Jersey, and far-off California. The legislators of these states who put through the original Workmen's Compensation Laws, and who are improving these laws from year to year, deserve as much credit for the lives saved and the eyes saved as do you safety men and you public health workers. I know you will be the first to admit this because many of these laws protecting the eyes and the lives of workingmen and women have been written and passed at your request.

I repeat, regulatory legislation has done a lot of good in this country, but there is a point at which its value ends, and that is the point at which the law cannot be enforced because it does not express the will of the people or a majority of the citizens. A year ago we, as a nation, admitted that.

The National Society for the Prevention of Blindness, the American Museum of Safety, and other safety organizations represented here, have already done much to bring about public sentiment in favor of a genuinely sane and safe Fourth of July. But that job is not done yet. You cannot afford to let up on your educational work and think that some legislation alone will do the trick. I do not need to impress upon you the fact that legislation —even good legislation, needed legislation—is not easy to get.

I am for a Fourth of July in which not a single American child will be killed, in which not one boy will lose an eye, in which no child will be burned. My advice on how to get that kind of a Fourth of July is this:

First, get the co-operation of the fireworks manufacturers themselves;

Second, keep up your educational work;

Third, go after state-wide legislation, but plan it carefully and work together like a single team and not as a dozen separate organizations.

Among the other discussants commenting on the necessity for increased efforts to prevent fireworks accidents were Edward M. Van Cleve, principal of the New York Institute for the Education of the Blind; Dr. Edward Jackson, ophthalmologist, Denver; Dr. William F. Snow, general director of the American Social Hygiene Association; and Walter G. King, director of the Safety Division of the American Optical Company.

Symposium on Prenatal and Congenital Infections in Relation to Blindness and Impaired Vision

Joint Session with the American Social Hygiene Association and the National Health Council*

Chairman, William F. Snow, M.D., General Director, American Social Hygiene Association

THE chairman called attention to the presence in the audience of health officers, physicians, commissioners for the blind, nurses, social workers, and others, who have had wide experience in dealing with the prevention of blindness and who the chairman hoped would participate actively in the conference. Dr. Klauder, associate professor of dermatology and syphilology, Jefferson Medical College, was called upon.

Scientific Basis for Control and Prevention

Joseph V. Klauder, M.D.

As you know, interstitial keratitis and optic atrophy are the most serious manifestations of syphilis that cause impaired vision and blindness. Perhaps some of you may not know what interstitial keratitis is. It is an inflammation of the cornea, the transparent portion of the eye, which occurs only in children whose parents have syphilis; the children have congenital syphilis.

Optic atrophy is a degeneration of the optic nerve confined to those who have acquired the disease, in contrast to those in whom it is congenital.

During the six years that the clinic for the treatment of ocular syphilis, at the Wills Eye Hospital in Philadelphia, has been in

* For convenience in reading and reference, the proceedings of this round table have been edited and rearranged. A complete transcript is on file in the office of the National Society for the Prevention of Blindness.

operation, 372 patients with interstitial keratitis and 214 patients with optic atrophy have been treated. My presentation is based largely on a summary of the study of these cases. In a consideration of interstitial keratitis as a cause of impaired vision and blindness, the following factors are pertinent.

A statistical study of the incidence of congenital syphilis indicates it to be from one-half per cent to three per cent of the total population.

The basic principle in the prevention of interstitial keratitis is treatment of the pregnant woman who has syphilis. A number of writers reporting a larger series of cases have shown how effective anti-syphilitic treatment, when given to the pregnant woman, is in preventing transmission of syphilis. The Wassermann reaction, which is a blood test to determine the presence of syphilis, should be performed routinely on every pregnant woman. Anti-syphilitic treatment should be administered to every pregnant woman who has syphilis, and should be repeated at each pregnancy. If the treatment is given before pregnancy and throughout pregnancy, or even if it is given only during pregnancy, the proportion of healthy children approaches one hundred per cent.

The second principle in the prevention of interstitial keratitis concerns the early diagnosis of congenital syphilis, ideally, in infancy. The earlier anti-syphilitic treatment is begun, the better the results will be.

The third principle in the prevention of damage from interstitial keratitis concerns its early diagnosis. It is to be recalled that interstitial keratitis usually appears in children from the ages of eight to fifteen years, although it may appear as early as three years and as late as forty years.

In a study of our cases at the Wills Hospital, two circumstances stood out. One was the delay in the diagnosis of interstitial keratitis; the patients came mostly from outlying districts. That group, however, was not a very large one. The second circumstance concerned the treatment that was administered to such patients.

There is need for standardization of the treatment of interstitial keratitis, for studies similar to those on early syphilis conducted in three or four large syphilitic clinics throughout the country, and

recently published by the United States Public Health Service. If the National Society for the Prevention of Blindness or the American Social Hygiene Association would act as a clearing house to which a large number of clinics providing treatment for interstitial keratitis could send their data, such a step would, I think, be a very constructive one.

Our goal in the treatment of interstitial keratitis will not be attained until we prevent involvement of the second eye. To those of you who do not know what I mean, I may briefly say it is characteristic of the disease to appear first in one eye and then, after a lapse of a few weeks, a few months or a few years, in the second eye. What is greatly needed is a study to discover what causes involvement of the second eye. Admirable opportunities are available for studying interstitial keratitis, since it can be produced experimentally in rabbits. May I make a plea to ophthalmologists and to others that they become interested in the various aspects of syphilis in relation to interstitial keratitis and optic atrophy?

Another problem concerns the social-economic aspect of syphilis: the infection of the brothers and sisters of patients with interstitial keratitis, and the infection in the mother and father. For example, in one family of three children, the boy had interstitial keratitis. His mother had the disease. Naturally, from what you have heard me say in relation to the congenital aspects of interstitial keratitis, his little sister had it. The youngest was apparently normal. The father, a relatively young man, had a positive Wassermann reaction; with the disease ahead of him, speaking from a statistical standpoint, he refused treatment. He was unable to attend the clinic during the day.

Another child whose mother had interstitial keratitis gave every evidence of the fact that she had congenital syphilis. The grandmother was also examined by us and she too had the infection and a positive Wassermann reaction. There was a transmission of syphilis through three generations. That, fortunately, is rare.

In another family, the mother was the second wife of the father. Syphilis was transmitted through two wives and two sets of children over a period of seven years. Both the oldest child of the first marriage and the oldest child of the second marriage had interstitial keratitis.

In a discussion of optic atrophy as a cause of impaired vision and blindness, the following is a brief summary of our study of the 214 patients at the Wills Hospital.

Three-fifths of the patients were between the ages of thirty and fifty. The duration of the infection varied from ten to twenty-five years. The chief complaint was impaired vision and usually remained so throughout the period of infection. By that, I mean, they presented very few other symptoms of syphilis of the nervous system, of which their optic atrophy was a manifestation. These patients can be placed in the following four groups:

Group 1 is composed of men between the ages of thirty and forty, in whom the onset of optic atrophy is so rapid that early diagnosis is difficult.

Group 2 comprises a large percentage of patients, unfortunately, too large a percentage, in which one factor stands out very conspicuously: At the onset of their impaired vision, they visited opticians to obtain glasses; when the glasses did not improve their vision, they visited a second, then a third optician, making the rounds of opticians over a period of months and, indeed, years.

The third group received indifferent treatment; and the fourth group, a rather small percentage, had had adequate previous treatment.

The unfortunate circumstance is that the majority of these patients were unaware of their infection and, for that reason, received no previous treatment. Most of them, when they first came to us, had considerable impairment of vision. In many, only light perception, or recognition of finger movements, was present in one eye. In the other eye, they had visual acuity as low as 3/60 or 6/60. Our problem is to get patients to come to the proper place for treatment at the early stages of the disease, not as a last resort, after the lapse of months or, more likely, years.

Measures to prevent optic atrophy should include early diagnosis and adequate treatment of early syphilis; but, since many of these patients were unaware of infection—the visual difficulty was the first symptom of the disease to them—early diagnosis cannot be of much value in preventive measures.

The second step to prevent optic atrophy is early diagnosis of neurosyphilis; any remarks in that regard are addressed more to

doctors than to laymen. The pupillary abnormalities are the first objective signs of neurosyphilis. If a pupillary abnormality is discovered in an examination of a patient, its status should be determined. The spinal fluid should be examined in every patient who has irregular pupils. Ideally, such examination should be performed in every syphilitic patient whose infection is of longer duration than ten years. Any physician who has a patient, particularly a male, between the ages of thirty and fifty, who complains of impaired vision, should have optic atrophy uppermost in his mind.

CHAIRMAN SNOW: Dr. Cutler's part in opening this round-table discussion has been divided under introductory remarks which I shall ask him to make now, and replies to questions which may be addressed to him later, as the ophthalmologist in our discussion. Dr. Cutler, as most of us know, is medical consultant of the National Society.

Clinical Aspects of the Problem

Colman W. Cutler, M.D.

It is a privilege to speak here, and frankly. I am reminded of an actual incident: A wise mother, who was asked by a suitor for her daughter, replied, "Let us talk it over," meaning, perhaps, ways and means in these parlous times, but she added, "and bring your Wassermann." The youth might well have inquired whether the formality was mutual; it should be, always. This lack of frankness in the public mind and among some physicians is in part responsible for the slow progress in dealing with the venereal diseases.

Dr. James Kerr wrote, in 1928, in *Fundamentals of School Health:*

"In the first medical survey which the writer made in the London Blind Schools, in 1903, 42 per cent were assigned to ophthalmia neonatorum; but as there were many others whose troubles were probably due to this, but of whom there was no satisfactory history, it was felt that an estimate of 50 per cent would not be exaggerated. The number is slowly falling. In this respect large American cities can set us an example. The cases in places like London or Manchester should be one-tenth of their present numbers.

"Ophthalmia neonatorum is also the cause of much visual deterioration from corneal scarring in children not blinded.

"The next large group is interstitial keratitis. Many of these cases come on during school life, although the cause is congenital and some are also associated with deafness. Much can usually be done for vision by early and energetic treatment, but the hearing is rarely bettered, and in bad cases the individual is wrecked, although not totally blind or totally deaf. The prevention of syphilis and its effects in this generation would clear the schools of this group in a decade."

I have been asked to speak on the clinical aspects of this problem.

It is not possible to describe the course of a case of ophthalmia neonatorum. To a conscientious physician, and to the nurses who must be trained for their especial work, which is perhaps more exacting than that of the doctor, for the secretion must be removed constantly and so carefully that the cornea is not touched, the task is not to be put in a few words. Ophthalmia neonatorum should be reportable. The diagnosis, by means of a smear, is made the instant congestion and secretion appear; then the struggle begins to save the transparent cornea. This fight for vision may last for weeks or months before the eye becomes normal. Isolation and special nursing, to protect others, are necessary. Most hospitals are not equipped to care for the children. I have seen several infants within the past two months who had to be transferred to Bellevue, where they received careful treatment. It was the neglected cases which formerly were the most pitiful, before the use of silver nitrate became mandatory in most states.

With regard to syphilis and the eyes, we must remember that we are dealing with a systemic disease, one that involves any or all of the organs. The most evident of the congenital or prenatal infections is interstitial keratitis, but the deeper parts of the eye are as often involved. And this, as you have heard, can be prevented, probably in a large majority of cases (how many we do not yet know) by a simple blood test in pregnancy and by adequate treatment. I should like to read a resolution which was presented yesterday at the meeting of the Board of Directors of the Society:

"The National Society finds itself more and more called upon to co-operate with some of the larger movements for health which would carry with them the by-product of prevention of blindness

and conservation of vision, as, for example, the joint campaign for the elimination of prenatal syphilis. Dr. Park Lewis has been particularly interested in some of these movements and has prepared the following resolution for consideration at the present meeting of the Board of Directors:

WHEREAS, Congenital communicable diseases affect not only the individual but society at large, as well as the progeny of those who marry, thereby increasing the number of the unfit and adding largely to the unhappiness and to the economic burden of the world,

Therefore, be it Resolved, That the National Society for the Prevention of Blindness invite the American Social Hygiene Association, the National Tuberculosis Association, the New York Academy of Medicine and the New York State Medical Society to co-operate in requesting the State Board of Health to prepare a bill for introduction at an early session of the Legislature requiring that the issuance of marriage licenses in the State of New York shall be contingent upon the presentation of adequate assurance that no serious, contagious condition exists in either of the parties proposing to marry, which would menace the health of the other, the offspring, or society in general."

CHAIRMAN SNOW: I have a series of questions which have been handed to me. I shall hold these, together with the comments and questions presented from the floor, until we have heard from Dr. Rice, commissioner of health of the City of New York, who will speak as a public health administrator.

Health and Social Factors

John L. Rice, M.D.

I am glad to concur with the previous speaker's remarks on getting information on syphilis and gonorrhea to the public. Two or three months ago, I was invited to speak before a Kiwanis Club in New York on what the taxpayers in that group get for their money in the way of public health from the New York City Health Department. The talk was also being broadcast to the public.

I began by telling of the activities of the various boroughs. I think at the end of about the first five minutes I came to the matter of communicable diseases, which was followed with the venereal disease work. I no sooner had referred to "venereal diseases"

when I heard a commotion in the corner of the room; the kindly chairman had been whispered to and said, "You can't talk about venereal diseases." I hesitated for a moment and then went on with the rest of the talk.

A friend of mine, who is the president of the Connecticut State Medical Society, wrote me a letter the following day, expressing his appreciation for the talk and his regret that I had been cut off from talking about venereal diseases on the radio. It seems to me that the proper use of the radio is one of the steps in the advancement of public health education upon this important group of communicable diseases.

A few nights ago, I was coming in from Queens and I had as driver of the car a man of thirty or thirty-five, a pretty intelligent sort of person. On the way back, he asked, "Is it true that physicians cannot ethically treat cases of venereal diseases? Is there something in the state medical regulations which prohibits the ethical doctor from doing this or from giving treatments for venereal diseases?"

Those are two experiences which make me think we still have a long way to go in getting this information over to the public. I want to quote a few figures to show why health departments are deeply concerned with this problem as part of the larger question of protecting the health of mothers and children.

For years the Department of Health has called attention to congenital syphilis (see *Weekly Bulletins*), urging routine Wassermann tests on all expectant mothers. In the United States, various surveys show the following incidence of syphilis in expectant mothers: white women, from 1½ per cent to 16 per cent; and colored women, from 12 per cent to 34 per cent. The history of a patient, together with even a careful clinical examination, reveals only a small number of those infected. Thus, in Boston, clinical evidence alone revealed 2.2 per cent; while in this same group of women, with the aid of Wassermann blood examinations, 9.2 per cent were discovered infected. In Philadelphia, in 11 prenatal clinics where Wassermann blood tests were done only as they seemed indicated, only 1 per cent were diagnosed as infected; but when routine tests were made 5 per cent were discovered to be infected. In New York City the Health Department operates 20

prenatal stations. During 1933, 7,985 expectant mothers attended these stations. Routine Wassermann tests showed 4.6 per cent as having a syphilitic infection. Of the mothers coming to these stations, 30 per cent came during the first five months of pregnancy, 33 per cent during the sixth and seventh months, and 37 per cent during the eighth and ninth months.

In the case of syphilitic infection, the treatment of expectant mothers after the fifth month of pregnancy is generally of little value so far as preventing infection of the baby is concerned. This shows how unfortunate it is that 70 per cent of these mothers first came to the station after the completion of five months of pregnancy. This is one very important respect in which our prenatal work must be improved, for the health of both the mother and the child.

Our experience shows one other important need, namely, suitable treatment facilities for syphilitic expectant mothers. In most cases these women must be referred to the regular venereal disease clinics. I believe we should arrange to give this group special treatment, setting aside, perhaps, special days or hours when they may be given it. The general figures for syphilitic infection in expectant mothers for the city show 4.6 per cent; and for the central Harlem district, 12.8 per cent. This is one of the reasons why the health department needs to give special attention to Harlem.

We are attempting in our budget for next year to get additional funds so that more of these patients may be treated, and so that we may also do more epidemiological work in tracing the cases. We do a good deal on following up the sources of typhoid fever, diphtheria, and other diseases, but there are only a few places in this country and in other countries where real epidemiological work has been attempted in the control of syphilis. I think the time has come when we should be doing much more in New York City in follow-up of venereal disease cases.

Chairman Snow: We now have before us the scientific, medical, and public health bases for action in preventing blindness from syphilis, and in reducing the extent of damage so far as possible after infection has occurred in the mother or child during or following pregnancy. We have also, of course, incidentally brought out

the principles of action in dealing with the prevention of blindness from the other important infection in the so-called venereal diseases group—gonococcal infection. How shall we begin our general discussion? If it meets with your approval, I shall ask Dr. Klauder to include in his further remarks answers to some of the written questions handed to me.

Dr. Klauder: The first question is: In clinics where diagnosis and treatment of diseases of the eye or of visual defects are handled, what, in summary, should be the routine procedure for the discovery of syphilis as an etiologic factor? The answer should, very emphatically, be the routine Wassermann test. The second phase would be the history in relation to syphilis, and, third, the state of the pupils with reference to their irregularity, as a manifestation of syphilis of the nervous system.

The second question is: It would be of interest to know whether the drugs used in the treatment of syphilis ever result in impairment of vision.

I suppose the person who had this question in mind was wondering if the treatment of syphilis by any chance may contribute to the onset of blindness. There is one very well recognized drug used in the treatment of syphilis that does involve the optic nerve and produce an impairment of vision through a toxological reaction of the nerve, but it is used only in the treatment of certain cases of syphilis. It is used with the full recognition of that possibility. There are precautions that are carried out and, on the whole, the possibly disastrous result does not, I am sure, constitute any factor in the optic atrophy resulting from the disease itself. The routine treatment of syphilis does not in any way cause damage to the optic nerve.

The third question: Are the results of treatment of interstitial keratitis reasonably good? What percentage of cases so diagnosed is cured, with sight restored?

To answer that question briefly is difficult. On the whole, the results are good, one may say excellent, particularly if treatment is started early, before the cornea is damaged.

Chairman Snow: There is one question upon which I think we should appreciate Dr. Holloway's comment: Is acquired syphilis often a cause of blindness?

Dr. Thomas B. Holloway (Philadelphia, Pa.): Yes, very frequently. For example, acquired syphilis is usually the cause of so-called neurosyphilis, and so-called locomotor ataxia. It is perfectly true, there are a juvenile form of neurosyphilis and a juvenile form of tabes that give rise to optic atrophy. Here the influence on the optic nerve is from a third to a half the influence met with in the acquired type of tabes. Some of the statistics presented by Dr. Klauder referred to acquired syphilis. A third of the patients were over the age of thirty. It is likewise a fact that acquired syphilis can produce a form of interstitial keratitis, but it rarely does.

I might say that syphilis can affect any portion of the eye; many of the cases of iritis, or corneo-iritis, or what is described as uveitis, are caused by syphilis. In statistics from clinics that serve white people, the incidence of syphilis may be 13 per cent; but, frequently, the incidence for syphilis is complicated by other conditions that may be associated with it. In some of the clinics in the South, the incidence of syphilis has run as high as 75 or 80 per cent. I think the figures are exaggerated, since they are based on syphilitic treatment. Some of the treatments given to syphilitic persons will benefit ocular conditions that are not necessarily syphilitic.

Chairman Snow: Dr. Clarke, I have been asked to call on you as chairman of the National Health Council's Committee on Congenital Syphilis.

Dr. Walter L. Clarke: Congenital syphilis is a subject which challenges the interest of all organizations that are interested in children, and it is upon the basis of that interest that we have approached all the health agencies, members of the National Health Council, and a great many others, to join in a campaign against congenital syphilis. It is, perhaps, the most strategic attack of all, upon any phase of syphilis, for the reason that we can obtain dramatic results by comparatively simple methods.

I should like to illustrate with a concrete example what I have in mind. Shortly after the War, a young officer retired from the army, married, and in time, he and his wife had two children. The children appeared to be quite normal youngsters until the girl, who was the older, was about the age of eight; then the school doctor

discovered there was something wrong with her eyes. He sent her to an ophthalmologist, who examined her and discovered she had nterstitial keratitis, which had already involved one eye and was rapidly involving the other. That discovery led immediately to a study of the whole family (they went to a public clinic), it was found that the father, the mother, the older daughter, and the boy had syphilis. The subsequent history was this: The whole family went for treatment to a public clinic, because they were people of very small means; but the tragedy, as they felt it to be, which had fallen upon them seemed to bear very heavily, especially upon the father. Doubtless he felt himself responsible, for the man developed the symptoms of general paralysis, became violent, and had to be taken to a mental hospital, where he died three days after admission.

The girl who had interstitial keratitis persisted in treatment; in fact, the whole family went on with the treatment. In examining that girl a short time ago, I was amazed to see the splendid result achieved in her case. I also saw the remaining members of the family. The boy's condition, apparently, has cleared up quite well. The mother remained under treatment for a short time; then, because the husband was gone and the family was in desperate straits, she neglected her treatment and developed a gumma of the nose which caused a very unsightly scar upon her face. She felt as if she were wearing a badge that announced to all who saw her that she had syphilis. Not only that, but prospective employers turned her away because she wasn't a person whom they could employ to serve the public, so that the family got into really desperate economic straits.

Just to finish that bit of the story, we were able to arrange for further treatment of the mother and for a plastic operation which we believe will solve the economic problem as well as protect her future health. The girl has been cured, apparently, of her interstitial keratitis, but she has a congenital heart defect which may or may not be due to the poor nutrition and poor development which occurred before birth.

This is the really important point. The woman was pregnant twice. She was attended by a physician. She did not have a blood test at the time of either of her pregnancies. If she had had a blood

test, syphilis would undoubtedly have been discovered. If the syphilis had been discovered, it would have led in natural course to the discovery of syphilis in the husband, possibly preventing the later development of general paralysis of the insane. Almost certainly, syphilis would have been prevented in both children. That is the reason we are aiming in this joint campaign against congenital syphilis to have every pregnant woman examined early in pregnancy, and to have a routine serology as a part of that examination. If we do that we can prevent congenital syphilis in almost one hundred per cent of the cases. In addition, it gives us the natural lead to syphilis in the rest of the family. We are now realizing as never before that syphilis is a familial disease.

Chairman Snow: In answer to a question, Dr. Rice expressed the opinion that a law requiring blood examinations of all pregnant women would do little good now; because, among other things, it is very doubtful whether any way could be devised for enforcing it. I think we are all interested in Dr. Marshall's comments on this and on other questions which have been raised. As most of you know, Dr. Marshall is a doctor of public health of England, as well as a physician and experienced health and welfare worker in this country.

Dr. Jessie Marshall (New York, N. Y.): I should like to support what Dr. Rice said about laws. I am no great believer in laws as a means of treating disease.

It would be excellent for every pregnant woman to have a Wassermann test, but it seems almost impossible: first, because of lack of hospital facilities and lack of money; second, because of the amount of ignorance and prejudice on the part of the public and expectant mothers themselves. It is especially pertinent to bring up this question at this meeting, where there are so many nurses, social workers and public health workers, who are the ones, very often, to come in contact with the women even before they are pregnant. If nurses and social workers are able to explain in simple language the causes and effects of syphilis, they have the opportunity of stressing the great importance of seeking medical advice at the earliest possible stage in pregnancy. We cannot bring people in for treatment by force; they have to come willingly.

Only by getting them to understand the importance of prenatal care can we get our patients to come before the fifth month, as they do at present. As a matter of fact, Dr. Rice showed that a good percentage of patients come before the fifth month. In my experience in England, the women came in at the last possible moment. They waited until they were in labor before they sent for the doctor. In New York, while there is a great way for us to go, at any rate we can get thirty per cent of the women into the clinics to seek medical advice before the middle of their pregnancy.

Some of the prejudice on the part of physicians and patients against a routine Wassermann test is that at the present time, with the usual technique, it calls for the collection of 5 cc. of blood. It is very encouraging, therefore, to find that Widener, of the British Ministry of Health, recently showed how the Wassermann and the flocculation test for syphilis can be carried out on a very small amount of blood. He can get results with .15 cc. of serum. I hope that laboratory workers in this country will find it advisable to develop his technique.

In considering the problem of routine blood tests, it must not be forgotten that, so far as physicians in private practice are concerned, many are working under great pressure and receiving little monetary return. I had a little experience assisting a physician who was receiving frightfully small fees. To make a living, he had to rush his patients through. It could not be expected that he should take a routine blood test with his limited equipment and fees.

The question also arises in my mind whether there may be some relationship between maternal mortality and syphilis, and whether the routine Wassermann test, followed by proper treatment, might not reduce the present rate. In this connection, it occurs to me that studies might be made of women bringing children to hospitals and clinics—women who are apparently healthy. I was interested in some figures from Aberdeen, Scotland, which showed that seventy-five per cent of the mothers coming to an ordinary children's clinic, as healthy individuals, were discovered to have severe degrees of anemia. It would be helpful if we could discover also how much latent syphilis there is in a group of this type. If it is possible to secure the co-operation of these women in determining

their anemia, it might be possible to give them a blood test at the same time, since they are already in a receptive state of mind and are willing to have any tests made.

I appreciate Dr. Klauder's sympathetic attitude toward the syphilitic person. Up until a few years ago it would have been difficult to get over to the public the fact that anyone who has syphilis is a sick person who needs treatment. It is only in the past several decades that hospitals have taken cases of syphilis. An enormous amount of prejudice still exists, with the consequent difficulty of getting money for the treatment of venereal diseases.

As a final word, I can only repeat that the problem of antisyphilitic treatment in pregnancy is twofold: first, education of the public, especially prospective parents, as to the need of a routine Wassermann test as a part of prenatal care; and, second, the development on the part of the medical profession of techniques by which testing and treatment may be simplified as much as possible.

Chairman Snow: Dr. Goldberg, you have had many experiences with law enforcement.

Dr. Jacob A. Goldberg (New York Tuberculosis and Health Association): I can tell you that a law won't do any good. In our study in twenty-eight hospitals, we found the great majority of the women got only one injection. Many of the doctors felt that was all they needed. The women never came back. It was known right along they had syphilis. The husbands weren't brought in in half of the cases. What good would a law do? We can't depend on the private hospitals because they are not in a position to help; they have to turn a great many patients away. In one hospital, eighty-five per cent of the patients in the syphilis clinic are treated free of charge. What good would a law do in the family Dr. Clarke tells about, with four people in the hospital, each requiring one treatment a week at $3 "a shot"? The thing to do is to increase the budget of the Health Department to meet the needs.

Chairman Snow: Mr. Carris, what other questions should we include in our discussion?

Mr. Lewis H. Carris (National Society for the Prevention of Blindness): I do not know what the experience of other agencies

has been, but we have had several examples of the unwillingness of the press and radio officials to mention syphilis, as such. Most of you, I know, have either read or heard of Dr. Parran's recent experience with a national network, and the fact that he was refused a voice on the air because he wished to discuss syphilis and the importance of public education on this subject. At the time, a New York newspaper, commenting editorially, condemned the radio executives for their action. Only a few days later, however, the same paper edited out the subject "syphilis" in recording the interview of a special feature writer with a member of our staff. When these two powerful means of public education do not accept the subject for mention, let alone discussion, we realize how far from enlightened the general public must be on this subject.

Dr. Rice: The broadcasting companies have been very much concerned about this problem and I think we shall be able to arrange a conference to discuss it. After all, the newspapers publish and the stations broadcast those features that the public wants. Up to the present time, apparently, it is their feeling that the public does not want any discussion of venereal diseases. Undoubtedly, they must have had some expression of public sentiment against it. However, there will be opportunities for planning with the radio officials procedures which may be useful for the future.

Mr. Theodore O. Yoder (National Society for the Prevention of Blindness): I believe that an experience I had as financial secretary may be of interest. It seemed to me that the necessity for prenatal care would make a worth-while appeal, and, with the help of Dr. Snow and other members of our Board of Directors, a letter was prepared setting forth the whole idea of prevention of prenatal syphilis. Over 2,500 letters were sent out and we have not had a single expression of disapproval or criticism; in fact, many sent in contributions, showing that they felt this work must be promoted.

Chairman Snow: Dr. Exner, we should appreciate your comments on any of these questions.

Dr. Max J. Exner (American Social Hygiene Association): From the point of view of prevention, congenital syphilis is the most hopeful form of the disease. As to cure, it is considerably

more resistant to treatment and less successfully treated than acquired syphilis. The prevention of congenital syphilis resolves itself into two main steps: securing a blood test in the early examination of every pregnant woman; and immediately instituting treatment in those infected.

Because of the excellent results obtained from the law in regard to ophthalmia neonatorum, we might wish it were feasible to have a compulsory blood test for every pregnant woman.

Congenital syphilis must be attacked along these two lines: First, the persistent education and persuasion of the medical profession that a blood test should be included in the examination of every pregnant woman; and, second, because of the fear of the general medical practitioner of offending the patient, the persistent education of the general public so that no pregnant woman in any walk of society will resent the taking of a blood test, but will welcome it and, indeed, insist upon it for her own protection.

Chairman Snow: When President Roosevelt was governor of this State, he appointed a commission to review the program of the state and decide what were the next steps to be taken in perfecting the public health service. The commission reported, among other things, that syphilis was the next great disease which should be brought under control. Dr. Pfeiffer will, I am sure, be glad to say just a word to us, as the director of the Division of Social Hygiene of New York State.

Dr. Albert Pfeiffer: Why haven't we eliminated impaired vision and blindness from communicable diseases altogether, or why haven't we reached nearer that goal? Possibly, a few examples may bring these reasons before us.

A week ago, I was called in to see a youngster in a hospital, a little girl six years of age, totally blind in the right eye. It was with considerable difficulty that the welfare commissioner and the health officer of the county were able to get that youngster into a hospital, because the trustees still held to the old idea that there must be something radically wrong with anyone having that affliction.

The day before yesterday, a health officer sent in regulations to be approved by the State Commissioner of Health, designating the

county jail as the place to isolate a person with syphilis. There is a physician who designates a jail as the place for a patient sick with syphilis. We have to change public opinion—the point of view of physicians, lawyers, well-meaning bankers, citizens in the community, everybody—a slow, educational process.

Some progress has been made. In the past month, thirty more clinic periods were established in New York State. This month we expect thirty more, with the aid of TERA funds and other funds. Last week, we established a special clinic in Poughkeepsie just for the care of children and prospective mothers, which has already handled twenty-five cases.

With blood tests becoming routine, there is chance for improvement as there is in every phase of medicine and public health. In up-state laboratories, from nine and ten thousand the first year the laboratories were in existence, six hundred and fifty-odd thousand blood tests are being performed. Blood tests are being taken in state institutions and hospitals generally all over the country and in all the various clinics.

Chairman Snow: Dr. Edward L. Keyes was expected to participate in this meeting, but his physician would not let him come. Physicians do get ill, once in a while. He is the president of the American Social Hygiene Association. He was the chairman of its first Executive Committee, one of the charter members of its Board of Directors. He served as a pioneer in that movement, with Dr. Jackson, who is here with us as our guide, philosopher and friend in all our meetings today. I think one way of getting Dr. Jackson to say a word to us is to ask him if he won't represent the American Social Hygiene Association in this session.

Dr. Jackson (Denver, Colo.): I feel that the only way I could hope to represent Dr. Keyes would be in the matter of length of experience and observation of how things change, when seen in a long perspective. Those of us who have been here this afternoon and have felt it a highly educational opportunity should not underrate the importance or the slow progress of education. It is real progress. We must remember that here this afternoon, as every day, the past meets the future. The new knowledge must over-

come old barriers, and old barriers are very difficult to remove. The lesson, above all, that has come to me this afternoon is that we are going forward and that, looking forward, we see a lot of new opportunities of which no other generation has ever dreamed. Among these, is the growing public consciousness that syphilis is actually a disease that must be treated medically. If we can entirely eliminate the old attitude and substitute the knowledge that syphilis is a public health problem, we shall make more rapid, permanent progress.

Chairman Snow: We have come to the end of the two hours allotted to this discussion. I think that we should adjourn upon Dr. Jackson's high note of prophecy.

Editorial

Colman Ward Cutler: 1862–1935

A GENTLEMAN of the old school was Dr. Colman Ward Cutler, courteous to all, gracious, and appreciative of even the smallest acts of kindness. So modest was he regarding his achievements, one could learn only from others that he stood at the head of his chosen profession of ophthalmology. He was generous, beyond words, of his skill, his time and his energies. He gave unstintingly to those who had little to offer but gratitude.

Perhaps the word that best expresses his personality is "courageous." He founded his opinions carefully, thoughtfully and scientifically, and defended them with indomitable courage. It was this very courageousness that made him so sympathetic to the opinions of others, even when such opinions were in opposition to his own. It was this very courageousness that was so disarming in its effects that children found him gentle and tender in his ministrations, making it possible for him to exorcise their fears and win their confidence and co-operation. It was this courageousness that gave his patients such confidence in his judgment and induced such willingness to follow his advice.

Dr. Cutler served the National Society for the Prevention of Blindness with great devotion as a member of its Board of Directors and, during the past two years, as its Special Consultant. In every letter that he wrote, there was something of his own personality; even when he could give no hope he imparted something of his own courage to aid the sufferer to face life.

In the same spirit of devotion, the members of the Board of Directors of the National Society for the Prevention of Blindness and the Editors of the Review pay tribute to one who, both physically and spiritually, opened the eyes of the blind.

Note and Comment

Baltimore Makes Record.—Public health team work has been so perfected in the city of Baltimore that since 1929 no Baltimore baby has become blind because of birth infection. Any report of sore eyes in a newborn baby brings the same response from the health authorities in Baltimore that a three-alarm fire signal brings in the fire house. Although about 500 cases of babies' sore eyes come to the attention of the Department of Health each year, of which seven to ten per cent are gonorrheal in origin, the co-operation between hospital, physicians, public health nurses and health authorities has ably demonstrated that blindness from this cause is preventable.

Summer Training Courses for Sight-Saving Class Teachers.—Courses for the training of teachers and supervisors of sight-saving classes will be offered at the 1935 summer sessions of the following colleges and universities: Western Reserve University, Cleveland, Ohio, from June 24 to August 2; State Teachers College, Buffalo, New York, from July 2 to August 9; Teachers College, Columbia University, New York, from July 8 to August 16. Details regarding the courses may be obtained from the university or college offering the course, or from the National Society for the Prevention of Blindness.

Campaigning for the Reduction of Prenatal Syphilis.—The importance which social, medical and legal groups attach to the social hygiene problem was shown in the interested response of many groups to the recent Regional Conference on Social Hygiene, called under the auspices of the New York Tuberculosis and Health Association in New York City. From the point of view of social work, education, medicine and public health, as well as of domestic relations, the problem of reduction of prenatal syphilis claimed attention.

"There is no subject that requires greater attention than a disease like congenital syphilis, which is a tragedy of motherhood and a destroyer of children. The continued death of babies from con-

genital syphilis is inexcusable because it is preventable. . . . Our aims are: (1) to urge all expectant mothers to seek medical care at the beginning of pregnancy; (2) to stress the need of the Wassermann test early in pregnancy; and (3) to arouse on the part of the public a wider understanding of the dangers of congenital syphilis," said New York's Health Commissioner John L. Rice, in a recent message to health and welfare agencies, in inaugurating a co-operative educational effort against congenital syphilis. Participants in the campaign are the Department of Health, the Co-ordinating Council of the Five County Medical Societies of New York City, the Committee on Social Hygiene of the New York Tuberculosis and Health Association, the health and welfare agencies represented in the Health Education of the Welfare Council, and other affiliated groups.

Health in New Mexico.—In order to define more definitely than heretofore the important public health problems of the state of New Mexico, the New Mexico Tuberculosis Association organized a state-wide health survey, in which the National Tuberculosis Association, the American Social Hygiene Association, the United States Public Health Service, the Office of Indian Affairs, the National Society for the Prevention of Blindness, the American Red Cross and the American Public Health Association participated. For the conservation of vision a survey was made in key counties, first, to determine what was being done to save the sight of children, and, second, to render assistance to public health nurses and municipal and county superintendents of schools in enlarging the phases of their health and educational programs that pertained to sight conservation. A full report of the undertaking has recently been made in *Health Survey of the State of New Mexico*, published by authority of the New Mexico State Planning Board.

Greater New York Safety Conference.—For the sixth time the Metropolitan Chapter of American Society of Safety Engineers called a conference in New York City, in which the co-operation of safety, health, and industrial groups was fully utilized. Of special interest at this year's meeting was the conference on Child Education in Safety. The National Society devoted most of its exhibit

space to a display featuring the hazards of fireworks and other forms of Fourth of July celebration, as well as eye hazards in child play.

Lighting Conference Emphasizes Better Light—Better Sight.—At a meeting of lighting experts called by the National Better Light—Better Sight Bureau in New York City, many phases of lighting and its essential partner, seeing, were discussed. Of special interest were papers on the "Social Significance of Better Sight," given by James Edward Ives, senior physicist of the United States Public Health Service; "The Importance of Good Sight for Human Safety," by R. E. Simpson; and "A Magazine Editor's Impressions," by Mrs. Clara Savage Littledale, editor of *Parents*. A visaphone presentation of "The House of Vision" demonstrated the physiology and mechanism of sight in a style suitable for school children and lay audiences.

Miniature Industrial Posters Available.—"Goggles"; "Don't Trust Your Eyesight to Your Neighbor!" "He Took a Chance," envelope-sized reproductions of the Society's industrial posters, are available in sets of 100 each, upon request to the National Society's headquarters, 50 West 50th Street, New York, N. Y.

Conserving the Sight of School Children.—Approximately 3,000,000 school children in the United States are handicapped in their education by defective eyesight. For the benefit of these children, and to prevent their ranks from increasing, the Joint Committee on Health Problems in Education of the National Education Association and the American Medical Association, in co-operation with the National Society for the Prevention of Blindness, has issued a third edition, revised and brought up-to-date, of *Conserving the Sight of School Children*. "The importance of good eyesight among school children cannot be overestimated," says the report. "We have come to recognize that defective vision or disease in the eyes of the child not only may have detrimental influence on his school progress, but may react upon his general health and upon his adjustment to his school, his playmates, and even to his family. This recognition has given new impetus to the

work of discovering and correcting visual defects among children, beginning with the preschool age."

The report is available at cost, 35 cents, from the National Society for the Prevention of Blindness; the National Education Association, 1201 Sixteenth Street, N. W., Washington, D. C.; or the American Medical Association, 535 North Dearborn Street, Chicago, Illinois.

Safety Glass for New York Buses.—As the result of a bus disaster in Ossining, New York, during the past summer, the Public Service Commission of New York has issued new regulations for the safety of passengers on buses operating in the state. After January 1, 1935, all buses must have safety glass in the windshield and in the window at the driver's left hand. After January 1, 1936, all the glass throughout the bus must be of safety construction, and must be so marked. This will eliminate the possibilities of flying glass, with its disfiguring and often disabling results, in the event of an accident. This ruling, and the regulations for safety glass in other classifications of motor vehicles, apply only to cars made after the specified dates, and are not retroactive on cars manufactured before those dates.

National Society Notes.—Dr. Park Lewis, vice-president of the Society, talked over a wide network of radio stations on "The Prevention of Blindness," under the auspices of the radio bureau of the New York Academy of Medicine. Hundreds of letters and many requests for the Society's material have been received as a result of the talk.

In visits to seven southern states, Mr. Lewis H. Carris, managing director, assisted local groups and committees to formulate and to develop prevention of blindness activities. In Louisiana, Mr. Carris was a speaker at the annual meeting of the Louisiana Society for the Prevention of Blindness, and participated in the widespread programs on sight conservation given before local organizations; in particular, the New Orleans Kiwanis Club, the Orleans Club, the Rotary Club, the Co-operative Club, and the Young Men's Business Club. After a conference with ophthalmologists in Alabama, he assisted in drafting a bill to be submitted to the legislature to provide the Alabama State Institute for the

Deaf and Blind and the State Medical Association of Alabama with funds to improve the sight and hearing of pupils in the Institute. In Florida, he conferred with ophthalmologists on projects connected with prevention of blindness work. He also visited Georgia, North Carolina, Virginia, Maryland and Mississippi.

Mrs. Winifred Hathaway, associate director, talked to a New York University course in child hygiene on sight conservation, and was a guest speaker at a meeting of the Stamford, Connecticut, Lions Club. She attended the annual conference of the International Council of Exceptional Children and the 65th annual convention of the National Education Association. Dr. Anette M. Phelan also attended the convention as a member of the Joint Committee on Health Problems in Education of the National Education Association and the American Medical Association.

The Section on Ophthalmology of the New York Academy of Medicine devoted a meeting to discussion of the ophthalmologist and the prevention of blindness, the care of the blind, and sight-saving classes. Dr. Park Lewis, Mr. Edward H. Van Cleve, principal of the New York Institute for the Education of the Blind, Dr. Conrad Berens, and Mrs. Winifred Hathaway were contributors to the forum.

As director of nursing activities, Miss Mary Emma Smith, R.N., talked to a meeting of nurses under the auspices of the Newark, New Jersey, City Department of Education; she gave a vision testing demonstration to members of the Kindergarten Association in Stamford, Connecticut. "Saving Children's Eyes," was the title of a talk Miss Smith gave over a New York radio station.

Current Articles of Interest

A New Theory of Binocular Vision, F. H. Verhoeff, M.D., *Archives of Ophthalmology*, February, 1935, published monthly by the American Medical Association, Chicago, Ill. Corresponding retinal units are represented separately somewhere in the brain, but each of every pair is represented in consciousness by the same single unit, says the author. For the seeing of two corresponding images as one, the term "unification" is suggested. The terms "fusion" and "suppression," as applied to vision, are misnomers and should be abandoned. The writer concludes that, since somewhere in the brain corresponding retinal images must be represented separately, and there is good reason to believe that in the occipital lobes they are so represented, it seems possible that in this region is chiefly situated the sensory nervous mechanism for stereoscopic perception of depth.

The Result of Orthoptic Treatment in Divergent Squint, Sheila Mayou, *British Journal of Ophthalmology*, January, 1935, published monthly by the British Journal of Ophthalmology, Ltd., London, England. In a series of cases, aged from 4 to 12 years, in which orthoptic treatment was given in conjunction with other types of treatment, it was found: 1. Cases of divergent strabismus benefit from orthoptic treatment, whether they can be cured by treatment alone or whether they will need an operation; 2. The majority of cases seen are cured by orthoptic treatment alone, without operation; 3. The percentage of emmetropic cases is very high and the majority of them come under the heading of periodic or occasional divergent strabismus; 4. There are very few divergent squints associated with amblyopia. The writer amplifies her conclusions with case records.

Social Service in Ophthalmology, Eleanor P. Brown and Lawrence T. Post, M.D., *American Journal of Ophthalmology*, February, 1935, published monthly by the Ophthalmic Publishing Company, St. Louis, Mo. Without follow-up of patients, many eye conditions cannot be brought to a satisfactory ending. The social service

worker in an eye clinic is of special value to the ophthalmologist and to the patient in bringing about continuity of treatment; the authors urge ophthalmologists to awaken to the advantages to be gained through utilizing social service.

The Prognosis in Spontaneous and Traumatic Detachment of the Retina, Charles Goulden, F.R.C.S., *Lancet*, October 6, 1934, published weekly by the Lancet, Ltd., London, England. Describing the methods of treating retinal detachment, the author concludes: "It does not seem likely that we shall achieve a much higher percentage of successes in the direction of replacement of the retina . . . but we may hope for better result in the direction of preserving central vision; this will depend almost entirely upon the early recognition of defects in the retina so that an operation may be performed before the retina has become extensively detached and, more especially, before the macula has become involved."

Primary Glaucoma, G. Herbert Burnham, F.R.C.S., *British Journal of Ophthalmology*, December, 1934, published monthly by the British Journal of Ophthalmology, Ltd., London, England. Outlining the respective values of the different forms of treatment of this disease, the writer concludes: ". . . . . that internal medicinal treatment, as advocated in this article, is superior in many ways to, and more to be relied upon, than the usual modes of treatment of this disease."

Industrial and School Lighting, Henry B. Dates, *Transactions of the Illuminating Engineering Society*, December, 1934, published monthly by the Illuminating Engineering Society, New York, N. Y. A summary of the results of some of the more important work completed during the past year by the Committee on Industrial and School Lighting. Investigations to determine the relation between light and safety as they pertain to schools and industrial plants are reported, and a cross-section of the promotional and engineering status of industrial lighting conditions throughout the United States is presented. A survey of lighting conditions in sight-saving classrooms is also described, and data are given on the influence of various levels of illumination as they affect the interest,

attention and well-being of both students and teachers. A section also describes general classroom lighting in schools and in dormitory and study rooms in universities.

Practical Details in the Orthoptic Treatment of Strabismus, George P. Guibor, M.D., *Archives of Ophthalmology*, December, 1934, published monthly by the American Medical Association, Chicago, Ill. Describing the technique of orthoptic treatment for squint, the author demonstrates that, while in usual squint treatment—refraction and occlusion of the fixing eye—a period of treatment of twelve months shows improvement in 25 per cent of the cases, with orthoptic training the improvement is reached by 50 per cent of the cases at the end of six months. This technique not only brings about improvement in twice as many cases as do older methods, but, in half the time, demonstrates to the ophthalmologist and the parents the feasibility of continuing treatment or resorting to operation. During the discussion of the paper, it was pointed out that the ophthalmologist had little time to devote to the arduous task of giving treatments and that the training of lay technicians to work under ophthalmological supervision was of special significance at this time.

The Effect of Diet and Vitamins on Trachoma, C. E. Rice, M.D., Robert Sory, M.D., J. E. Smith, M.D., P. E. Faed, M.D., and A. A. Drake, M.D., *American Journal of Ophthalmology*, August, 1934, published monthly by the Ophthalmic Publishing Company, St. Louis, Mo. Thirty patients with trachoma were studied for varying periods to determine the effect of diet and vitamins on the course of the disease. There was no evidence that a balanced diet supplemented by cod-liver oil and brewer's yeast affected the course of the disease.

Ophthalmological Symptoms and Complications of the Common Acute Infectious Diseases of Children, C. Dwight Townes, M.D., *Kentucky Medical Journal*, October, 1934, published monthly by the Kentucky State Medical Association, Bowling Green, Ky. Concise outline of the eye signs in childhood diseases, the prophylactic care of the eyes during the severe stages of the disease, and possible sequelae. Measles, scarlet fever, influenza, diphtheria, whooping cough and mumps are discussed.

The Efficiency of Orthoptic Training in Strabismus, J. L. Bressler, M.D., and Katherine H. Chapman, M.D., *Illinois Medical Journal,* September, 1934, published monthly by the Medical Profession of Illinois, Oak Park, Ill. Outlining the methods of treating and correcting squint, the authors conclude that the necessity for surgery in squint patients will be greatly reduced if orthoptic treatment is carefully carried out. When surgery becomes necessary or has been performed, the final results will be much better with orthoptic training than with surgery alone. The authors have found that treatment of amblyopia before surgery will assure better results.

Rôle of the Gonococcus in Purulent Ophthalmia in Warm Climates, A. F. MacCallan, M.D., *Archives of Ophthalmology,* December, 1934, published monthly by the American Medical Association, Chicago, Ill. The writer has found that while trachoma predisposes the eyes to gonococcic conjunctivitis during the hot weather, the presence of pannus affords some protection to the cornea against ulceration. It is found that there is a marked atmospheric influence on the occurrence of gonococcic conjunctivitis, since the number of cases and the percentage of its incidence rise with the spring rise in temperature. The incidence of blindness from gonococcic ophthalmia increases with age, either because of complications of cataract and glaucoma, or because of recurring ulceration which impairs and destroys vision.

The Relation of Glaucoma to Blood Pressure, Paul Weinstein, M.D., *Archives of Ophthalmology,* February, 1935, published monthly by the American Medical Association, Chicago, Ill. It is found that arteriosclerosis and glaucoma, both met with more frequently in the male than in the female, have a definite relationship. The writer says that it is possible that a nutritional disturbance, caused by a pre-arteriosclerotic condition, might explain the development of glaucoma simplex.

Summary of Refractive Conditions and Causes of Blindness in Mississippi, A. G. Wilde, M.D., *New Orleans Medical and Surgical Journal,* November, 1934, published monthly by the Louisiana State Medical Society, New Orleans, La. Reviewing 272 cases of

blindness in his own patients, the author finds that more than twice as many men are listed as women, probably because the element of industrial eye hazard is more frequent among men than women; traumatic blindness was found in 91 cases. Glaucoma was the second greatest cause of blindness, causing more than 15 per cent of blindness. From the study, it was found that a little less than half the cases were hopeless from the start; 36 per cent could probably have been helped at one time; and 14 per cent of those now blind may possibly have vision restored. Of 3,000 cases of refractive errors, myopia was found in a small portion; hyperopia accounted for 25 per cent of the total, and compound hyperopic astigmatism brought 45.7 per cent of the cases for ophthalmological care.

Eye Injuries and Their Treatment, Paul G. Moore, M.D., *National Safety News*, November, 1934, published monthly by the National Safety Council, Chicago, Ill. While it is the safety organization's concern to prevent eye accidents from occurring, the eye physician is interested in the preservation of vision after the accident has occurred and in preventing subsequent complications that imperil the sight. The author advises that all particles lodged in the eye be removed by an eye physician or by a trained nurse who is working under the supervision of an eye physician, for the ultimate preservation of sight. Reviewing cases, he finds that eye accidents occur not only in those occupations commonly considered hazardous to the eyes, but also in widely diversified tasks and fields.

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Medical Social Service in an Eye Clinic

Amy G. Smith

THE medical social eye worker is an important agent in the conservation of vision program

NOT so long ago there was only a handful of medical social workers in the whole country engaged in eye social work. In fact, there was not much concern displayed among medical social workers regarding the eye or eye diseases; this seemed a field somewhat removed from other more urgent medical conditions. The wide field of pediatrics, and those fields of medicine that carried a social significance, legitimately claimed their first attention; and medical social workers, not being too plentiful, were soon swallowed up in the other fields of work. Organized groups in the community were at work on programs for conservation of eyesight and prevention of blindness, and were already gathering persons with handicapped vision for follow-up work. It had not been fully demonstrated what a valuable adjunct an eye clinic equipped with social workers could be to this constructive movement in prevention of blindness. Nevertheless, it was a commission for the blind that saw the opportunity to use an eye hospital to further its purposes.

History

The Massachusetts Commission for the Blind had been aroused by the unusually high incidence of blindness in babies in the community and became concerned with the question of cause and prevention. In 1907 it gained permission to install a social worker at the Massachusetts Eye and Ear Infirmary. This was the beginning of the first real eye social work in the country. In this initial step it was clearly stated that the social worker's services were to supplement the medical work for prevention of blindness.

The campaign of education, followed by legislative measures, which was carried on by the Massachusetts Commission for the Blind and the State Board of Health during 1911 and 1912, and even later, for prevention of blindness in babies is now a matter of history. Far-reaching were the ultimate results. The National Society for the Prevention of Blindness, medical societies and local commissions for the blind all took up the cudgels in their fight to do away with this unnecessary evil. What particularly interests us, here, is that in those first five years of social work at the Infirmary the careful investigations made by the social worker of all the circumstances surrounding the birth and eye infections of every baby admitted to the Infirmary proved so illuminating that the study was used as an effective part of the propaganda in this far-flung campaign.

Ophthalmia Neonatorum

But quite aside from all the publicity and activities encompassing this subject was the difficult educational work to be accomplished by the social worker in her intensive work with these cases of ophthalmia neonatorum. The foreign-born mother was prejudiced against sending her young baby to a hospital; she was ignorant of the risks of blindness; it was much easier to believe her baby had a cold and the eyes would soon be well. Foreign mothers nursed their babies, and how would a baby be fed in the hospital if the mother remained at home? There was always difficulty for the social worker who tried to explain to certain parents why they should be examined in a special clinic and perhaps have special medical treatment. As this work progressed, the experiment of admitting the mothers to the Infirmary with their babies was tried. This not only made conditions favorable for the babies' feedings, but it also gave the worker an excellent opportunity to have the mothers examined at the General Hospital and placed under treatment if it was needed. Later, this practice of admitting the mothers was abandoned and the co-operation of the community health nurses was secured so that their visits, with instructions in the homes, would result in the mothers' milk being sent to the Infirmary. This latter plan has continued to our day.

Social Problems

A variety of social problems attended these cases. They were worked out with whatever facilities the community afforded the social worker. As there were but few social workers in maternity work at that time, the worker at the Infirmary had the entire program for the babies' welfare to meet: the after-care when the baby left the Infirmary, placing of babies where problems of illegitmacy made it necessary; and the follow-up of other babies, for months, in their homes. Without a doubt, the lessons the worker gave in the babies' families during those years bore immeasurably good results. Social service records show that the prejudice of foreign mothers about sending their babies to the hospital was broken down and that the social worker's visits were received more and more cordially as time went on. Certain procedures established in that early work have continued to the present day, as they have proved essential for bringing about the best results.

Phlyctenular Keratitis

It was with the advice and co-operation of the medical staff that the worker chose certain eye diseases for intensive social work. Those largely affecting children and young adults were emphasized —phlyctenular keratitis, interstitial keratitis, and ocular tuberculosis were the first conditions chosen, and, soon afterwards, glaucoma was added. Besides the conditions selected for intensive work, a longer list of diseases was chosen for clinic follow-up. This latter group has been changed from time to time (other diseases were added, some classifications, such as industrial eye injuries, were dropped). But, throughout the twenty-five years of work and growth of the social service department, the diseases for intensive work have continued to hold their significant places. As new workers were added to the staff it became possible to enlarge the scope of the work and to establish a clinic follow-up which today includes all of those diseases which would have serious results if allowed to go untreated.

Fifteen years ago the tuberculous child with phlyctenular keratitis was a more serious problem with us than he is today. It was not unusual to find from twelve to fifteen children in the nursery, burying their heads in pillows because of photophobia;

today, one such case would arrest our attention. The disease was more obstinate, recurrences frequent and severe, and children needed to be under medical and social supervision for months, even years. Old social service records indicate that a few of these children, suffering many severe recurrences, died in their early twenties in sanatoria. A six-years' study, from 1923 to 1929, of these children, undertaken by the Massachusetts Eye and Ear Infirmary in conjunction with the Massachusetts General Hospital, gave us many data on the course and treatment of this disease.* During the study the children were seen by the same doctors on each visit. Periodic general physical examinations, intensive home supervision with instructions in proper diet, good hygiene, home investigations to run down any possible tubercular contacts—these were all part of the routine treatment. Frequently, a child was sent to a sanatorium for treatment when positive tests were obtained. For years, we have had the privilege of sending young children with phlyctenular keratitis, coming from poor homes, to a nursery for blind babies (because there were not enough blind babies to fill the beds), and this opportunity has been a boon to our work. There, the very best care has been given under expert medical advice for a long enough time to insure complete physical rehabilitation of the child.

It is not clear why phlyctenular keratitis does not present such a serious problem today as it did fifteen years ago. Community health work has increased in these years; tuberculosis programs involve the supervision of entire families; school medical work and the number of school nurses have increased; health centers are in operation; and we have had periods of prosperity. A social worker told me that years ago it was a common thing for her to see, when visiting schools, children with their feet literally upon the ground, wearing untapped shoes, while she has not seen this condition in recent years.

We know that today there are many children who are not receiving the amount of nourishing food they need. Are we going to have more phlyctenular keratitis as a result? So far, we have not observed any increase in frequency or severity.

* "A Contribution to the Study of Phlyctenular Keratitis-Conjunctivitis," Maud Carvill, M.D.: *Transactions* of the American Ophthalmological Society, Volume 27, 1929.

Interstitial Keratitis

Children with interstitial keratitis are a challenge to any worker. It is estimated that a child with this eye disease loses at least a year at school. It is not so perhaps in every case, but often enough to make it a real problem for adjustment. So much depends upon the parents of these children that it is really a family problem. After the child's eyes have cleared, how often do we find a break in the regular visits to the skin clinic? When the obvious signs of the disease have subsided, many parents take a more sanguine view of the situation and feel that the danger zone has been passed. The subtleties inevitably surrounding the whole subject of interstitial keratitis call for a wealth of resources and a pliability of temper in the worker. The difficulty of obtaining 100 per cent blood tests in the patients' families cannot be reckoned. The question of when, temporarily, to hold up urging these examinations, when to resume action, and when to apply drastic measures with incorrigible patients, keeps a worker alert in her thinking and understanding of the individuals in these families. A father who was bringing his youngster to the eye and skin clinics faithfully, and was on very pleasant terms with the worker, persistently refused to have a blood test himself. On one of the visits he confronted the worker with the remark that Jimmie showed such wonderful improvement since coming to the clinic that he guessed he'd see if he himself needed any treatment.

A surprising amount of success in dealing with this difficult disease attends the capable and earnest worker. Her position of authority in supervising the long treatment in eye and skin clinics (often she must arrange the matter of expense, too,) gives her a place of intimacy in the family. Anxious questions come to her from the parents as to the outcome of their child's eyesight, with the natural fear of blindness hovering in the background. The expressed or hidden feeling of culpability on their part and the consequent remorse increase their respect for her help.

Strabismus

To win the wholehearted co-operation of parents is the crux of the success in children's medical problems. Ignorance, superstition,

suspicion, each and all are actively at work in a parent's seeming stubbornness. Hasn't an ignorant mother said that Tony doesn't need glasses? He will outgrow his cross-eye (strabismus). How much patience and skill are needed to make her understand that after Tony is six years old he will not be able to use both eyes in seeing. Tony will have to go through life with only one good eye, if he does not have treatment now to straighten his cross-eye. Then, there crops up another problem with Tony. Suppose he has gained the name "cock-eye" from his companions; perhaps he retaliates and gets into trouble, or perhaps he grows sullen and withdraws into himself. In either case it will make for a misunderstood, behavior-problem boy if his cross-eye is not corrected. A member of our social service staff, upon her visits one day, met a mother, with two youngsters on foot, wheeling a baby in his carriage. She saw that the mother was cross-eyed, so stopped her. All of the children were cross-eyed, and, in the conversation which followed, the mother said she had had no trouble with her eyes. She was surprised to learn that the children need not remain cross-eyed. Inside of two years all three children were fitted with glasses at the Infirmary.

Sympathetic Ophthalmia

Sympathetic ophthalmia is another disease the significance of which is often difficult to explain to parents. A youngster falls upon a picket fence, a BB gun goes off in his eye, or a Fourth of July firecracker explodes and the lad is brought to the clinic with an ugly wound in his eye. If the doctor advises removing the injured eye to protect the sight of the other, hardly a parent receives this news without questioning. The doctor, with all his knowledge, may not be successful in convincing the parents of the constant danger this diseased eye will mean to the other, even twenty or thirty years hence. He usually turns the job over to the social worker and expects to see the boy in the ward for an operation within the week. A foreign parent may have the hope and a superstition that sight will return to the injured eye if only it is not removed. The shocking thought of losing the eye obscures all suggestions of future danger to the other.

Congenital Cataracts

We have found that sometimes it is an individual outside the family who discovers that a child has something wrong with his eyes, later diagnosed as congenital cataracts. Parents do not want to find defects in their children and persuade themselves that an oddity will disappear in time. I remember a child of four years sent to the Infirmary by a doctor who was called when the youngster fell from a piazza. The doctor discovered the child had congenital cataracts and could not see well, but the family had not noticed this. Here is a disease that calls for repeated operations and needs much interpretation to the family. The results which follow the operations may be good, but the chances are that the child will have handicapped vision, and need follow-up for a long time, mainly to see that proper glasses are worn. He will be sent to a sight-saving class, if this is possible. If none is available, his school teachers will be carefully informed as to his handicap and all that it implies. Even though his vision ultimately is not too bad, he will be limited in his choice of employment throughout his life. The fact that congenital cataracts are thought to be conditioned by lack of certain nutritional values during the mother's pregnancy makes us aware that we should be alert to the possibility of eye trouble in the brothers and sisters of the patient.

Myopia

Not all of the children with myopia need our attention. A large number of them are reporting to an eye clinic each year for a check-up on their glasses. These patients will probably go through life having no difficulty with their eyes and following any trade or profession they are drawn towards. We must not get excited over this group of myopes. But here and there are children with a progressive, degenerative form of myopia, who, if not followed closely and guided in their choice of vocation, will fall by the wayside. After leaving the sight-saving classes, they usually tumble into the first job they can find. If money is sorely needed in the family, it is a hard pull to get them out of an improper job if a suitable substitute is not immediately available. Almost no regular vocational work is being done for these children and, seemingly, by a perversity of fate, the boys are often ambitious

and aim at college and professions. They do not take kindly to or see any advantage in more humble employment. We have started an experiment which we hope will solve the problem as time goes on. By gaining the co-operation of the sight-saving class teachers, a child is observed carefully while he is in school: Is he bright or dull mentally? Is he clever with his hands? Does he show any special aptitudes? In beginning this way, we hope to gauge some of Johnny's ability before the time for work comes, and to learn what type of work is suitable not only to his handicap but to his self-expression.

Tuberculous Eye Diseases

One should speak of the increase of tuberculous eye diseases, tubercular choroiditis, uveitis, sclero-keratitis and conjunctivitis, which the doctors at the Massachusetts Eye and Ear Infirmary are more frequently referring to us in these days. The present economic conditions in our life may be responsible for the increasing number of these patients. After all the medical examinations have been completed on each patient—chest X-ray, nose and throat, dental, old tuberculin skin test—it may be that sanatorium care will be advised. If so, this will prove to be a fairly simple solution of the problem so far as the social worker goes, but sometimes the patient rebels and wishes to remain at home. It is practically impossible to carry on routine treatment in the average home. If the patient is a child of school age, the parents or relatives must be of exceptional intelligence to supervise properly the home treatment. Usually, there is a loss of several months or a year of school work before the doctors advise return to normal activities, and school adjustments must be made. A housewife who is the mother of a little child has a difficult task in carrying on treatment in the home. Household difficulties must be adjusted and, when possible, divided among the members of the family. If the family finances allow, more satisfactory arrangements can be made for the patient. A man who is obliged to give up work and remain at home to carry on routine treatment is usually very unhappy, and recovery is delayed. The loss of work and the increased cost of a special diet are serious problems, and, when necessary, a private or a public relief agency must be asked to give assistance. A patient

who goes to a sanatorium stays there, on an average, from eight to twelve months, with good results. A few patients have improved in their own homes. On discharge from the sanatorium, the patient usually has acquired new habits of hygiene which influence his home living and, in a large measure, make for permanent recovery. We have felt that this group requires a great deal of very careful checking-up after they return from the sanatorium.

Follow-up

Much has been written of "follow-up" in hospital social work. It is generally conceded that for it to be most successful the control must begin with the physician. He, alone, can impress the patient with his sincere interest in the disease and his desire to see him again. The social worker may relieve the physician of much detail in explanation; she can save him much time; but she cannot make up for his thoughtlessness if he neglects to show real interest in his patient. The social worker must see that the patient has an understanding of his medical problem before he leaves the clinic.

Too much emphasis cannot be given to the general physical condition which may be the underlying cause of the patient's eye trouble. Frequently, a patient shows impatience when he comes to the clinic for his eyes and is told he must report to one, two, or three other clinics before the doctor can tell him where lies the trouble. When it is carefully explained to the patient that his eyes are only a part of his whole body and the real trouble may be elsewhere, he will accept all this clinic visiting in search of the focal infection. To help adjust a patient's attitude by giving him an understanding of the medical condition is sometimes the most difficult of a social worker's tasks. It requires intelligence and common sense on the part of the patient; if these are not there in sufficient amount, the worker has to search for some substituting quality to help her in finding an entrance into his mind. A laborer comes to the clinic complaining that he cannot see and wants glasses. It is found he has toxic ambyopia. When he is told he must give up his drinking, what it is doing to his eyes, he still asks for glasses. The chances are that he will try one or two more eye clinics before he settles down to believe what he has been told. When some social upset is at work in the patient's life complicating

his medical condition, it will be revealed to a skilful worker in the course of her interview. The patient must understand his own share of responsibility in the team work with the doctor and social worker, if a successful outcome of his treatment is to be achieved. A follow-up program of this character demands the services of a trained case worker. Even though her services to the patient may seem slight in comparison with intensive case work, it is only when she has this background of training and experience that she can make the most of her interviews, that her judgment will be adequate, that she will win the patient's confidence by giving him the sense of security and soundness which comes from a familiarity with long-time social problems.

Glaucoma

Although a worker's usefulness cannot be gauged by the quantity of work she handles, it may be in the capacity of carrying an intensive follow-up job numbering hundreds of patients that her unique value to the hospital is found. In behalf of these patients she will have a far-reaching influence through her relation to outside agencies, public and private, her contacts with people and groups of people extending over a wide area, to whom her interpretation of the needs of her patients must be given. The glaucoma work which is carried by one worker and a volunteer at the Massachusetts Eye and Ear Infirmary is an example of this follow-up. Over one thousand glaucoma patients went through the eye clinic in 1934. Each patient was interviewed by the worker; each patient received some service from her. As the clinic management and steering of these patients are the worker's responsibility, she has ample opportunities to become acquainted with patients. She interprets the disease and the doctor's orders to all of them. They must know that blindness is inevitable if the disease is not treated. We know that a quarter to a third of all the blindness in the country occurring in people over forty-five is caused by glaucoma, and also that simple chronic glaucoma sooner or later affects both eyes. We know that an operation is sometimes imperative. But there is reluctance on the part of glaucoma patients to accept some of these facts. Especially are they loathe to undergo an operation. Because of the long-continued treatment which is necessary and which does not bring a marked improvement in their sight,

patients become discouraged. Great tact, with honesty, must be exerted to encourage them with their treatments, the worker explaining how important it is to preserve their present sight. We have noted that many glaucoma patients who remain under treatment die before blindness overtakes them. They ask for glasses and it must be shown to them why glasses would not give more vision. A glaucoma patient who has been engaged in a skilled trade and is obliged to give it up and seek employment not requiring good eyesight may become somewhat warped in his outlook. If he has been obliged to give up work altogether, or if he has lost the pleasure of reading, he needs a worker who has a psychiatric point of view, one who can help him accept this hardship. Some glaucoma patients cling to their work, afraid to give it up, and will not give the time to treatment. These patients must be helped to find a way for treatment.

No one social worker, meeting one thousand patients in a year and recognizing the multitude of social problems entailed, could possibly take care of even a small fraction of them herself. She must be acutely aware of the resources the community has to offer. Patients come from a wide radius, city and town, and she has to search for adequate medical treatment for many of them living too far away to make regular visits to the clinic. The transportation from nearby towns of patients with low vision must be arranged. The relative, the social worker, the welfare society, the relief agent, the Commission for the Blind, any person or group best fitted to serve a patient's individual need is called upon. The worker's own situation is one of keen watchfulness that the services needed by her patients are fulfilled. One result from all this interpretation and education sent forth into the community has been an increase in the number of glaucoma patients coming to the clinic. A patient in a distant town has learned through a neighbor what her symptoms may mean and, although she might have blundered into poor medical treatment and in ignorance lost her sight, before it is too late she has been able to find supervised medical treatment for her eye in the clinic.

Dr. George S. Derby

The late Dr. George S. Derby, chief of the ophthalmic staff at the Massachusetts Eye and Ear Infirmary, was vitally interested in

eye social work. He worked to promote its growth and much of its efficiency was due to his direction and enthusiasm. A paper on "Medical Social Service in an Eye Clinic," read by Dr. Derby and discussed by three leading ophthalmic surgeons, contains this statement:

"I venture the assertion that of all the developments of ophthalmologic practice as applied to hospitals which have taken place during the past twenty-five years, this is by far the most important. I believe I do not exaggerate in saying that it has increased the efficiency of the service that we give our patients by fifty per cent at the very least."*

When one considers the advantages of team play the eye social worker engages in today with the community-wide agencies, the opportunities she has for co-operative services with the specialized fields, the fifty per cent increased service to the patients seems a modest estimate.

Prevention of Blindness

A close relationship exists between the eye social worker in the clinic and the prevention of blindness worker in the field. Patients with seriously handicapped vision are in need of long-time constructive plans. The eye worker in the clinic will refer the children who need special educational advantages and are eligible for sight-saving classes to the prevention of blindness worker, who will follow them throughout this schooling. Adults who have lost vision and will become blind, but who are still young and pliable enough to make adjustments in new trades, all need the prevention of blindness worker to tide them over into this new industrial adventure. These latter field workers greatly outnumber the eye social workers, as they must cover large areas of territory in their state-wide program. Today, fortunately, more eye workers are being trained for work in eye hospitals and clinics. We, who have seen so much good come out of eye social work, hope, in the not-too-distant future, to see all the important eye hospitals and clinics in the country equipped with this service as an aid to the medical treatment of eye patients. Its contributing value to the great cause of prevention of blindness is clearly perceived today. The future can only emphasize the facts which all eye workers have believed in for so long.

* Read before the Section on Ophthalmology at the Eighty-Second Annual Session of the American Medical Association, Philadelphia, June 11, 1931.

Fenestration and Natural Lighting

Alfred H. Fletcher, Theodore F. Foster, M.D., and Daniel H. Goodnow, Jr.

THE correct placement of windows for the best use of natural light is a great contribution to eye comfort

JUDGING by the scientific literature on the subject of illumination, the problem of natural lighting has not received from illuminating engineers the attention that artificial lighting has. There has not been very much concern with the efficient utilization of daylight in residences, apartments, schools, offices or factories. The amount of natural light that finds its way in is accepted and then artificial light is added when and where the daylight is insufficient.

Architects, illuminating engineers, and those associated with the window industry in general are apparently just beginning to become interested in increasing the limited scientific knowledge which is available on the vast natural resource of daylight. The rapid development of artificial lighting has perhaps served to distract the attention of architects and engineers from the study of natural lighting.

The use of natural light has held its place through building codes and the conservative custom of putting windows in buildings, both factors being based on our hereditary habit of using the sun as our source of illumination during the day. In recent times there has been discussion about the construction of factories without windows, in which artificial light will be used entirely, and one such structure has already been completed.

History of Natural Lighting*

The problem of admitting daylight to the interior of buildings and still providing protection from the weather was recognized in

* The authors wish to thank Leonard C. Peskin for the many suggestions and references which they obtained from his excellent paper "Past Research in Natural Lighting."

ancient Greece. At Basse, there have been found some remains of roof tiles with open centers, which might have formed small openings for light. It is supposed that the inner columns of the temples supported a sort of clerestory, formed by a channel on each side along the roof. This would give an excellent light, and the statues could be easily protected.

Although it has been ascertained that the Romans understood the manufacture of glass, it is believed that they were not accustomed to apply it as freely as we do to exclude the weather and transmit light. A wooden frame with four small squares of glass and a brass form with movable glass have been found; a piece of glass of considerable size was discovered in one of the walls of a bath.

Italy is credited with having had the first glass windows, next France, and then England. In the Norman architecture of the eleventh century, the windows in small buildings were mere slits in the exterior wall, probably not meant to receive glazing, and opening inward with a wide splay. In larger buildings they were much more important features, being of large size and adorned with columns. Glass was used for windows in private houses in the reign of Henry II of England, about 1177, but was imported. The manufacture of glass was established in England at Crutched Friars in 1557. It was improved in 1635, and was brought to great perfection in the reign of William the Third. It was not until the eighteenth century that flat glass became generally used in windows, and it was during this period that the window glass industry was started in the United States.

Advantages of Natural Light

One of the greatest benefits derived from natural lighting is the esthetic or psychological effect on human beings. Windows usually offer a view of the outside world, and in many cases allow sunshine to enter the room some time during the day. These things, as simple as they may seem, help to make people feel that life is really worth living. We have but to refer to the marked improvement that many convalescents show when they spend the day on porches which are inclosed by windows of common glass which transmit practically no ultra-violet light.

Good lighting promotes physical health directly in such a way that there is no question about its effect. Sunlight, when admitted through open windows, is germicidal, and rooms that are well lighted are usually kept cleaner than those which are dark and dismal.

Buildings equipped with window openings provide a means for ventilation which can be relied upon for changing the air in the rooms in the event of a failure of the mechanical devices for that purpose, or for the rapid removal of noxious gases which may escape in such quantities as to overload the regular ventilation system.

Natural light seems to have an advantage over artificial light in that the human eye and whole sight mechanism is said to be best adapted to it. When natural light is not adequate, it may be supplemented by artificial light. Contrary to a common belief, the two kinds of light can be used together satisfactorily if properly arranged.

Natural light is all that is necessary for the greater part of the time in the majority of schools and factories which are operated during the daytime.

It is hard to realize that a good price is paid for an illumination of less than five or six foot-candles all day when just outside there is available a natural light ranging from six thousand to ten thousand foot-candles.

Natural Lighting in Homes

In moderately priced, single and two-family dwellings good natural lighting is usually obtained. Building codes, housing laws and zoning regulations limit the width of a lot that can be used for the house to provide proper distance between houses as well as the height of buildings to insure good lighting. However, there are factors involved in the window design which tend to complicate matters. Tyler S. Rogers brings attention to the fact that the size, scale, and shape of windows are affected by both the exterior and interior of the house.

The windows in factories, business houses or schools may be scientifically designed even at the expense of presenting a somewhat odd appearance, but not so with the home. Rogers also

points out that window frames are manufactured in standard sizes and that the selection of a special design means additional expense. There is a tendency on the part of contractors to install a poor grade of window glass in homes. This is poor economy, for such glass makes objects outside appear distorted and creates a feeling of dissatisfaction for the tenant.

Building and housing codes in most of our larger cities specify minimum requirements for proper natural lighting and ventilation in apartment and tenement buildings.

Windows serve not only to light the rooms, stairways and halls, but are usually the sole means of ventilation. They also serve to admit noises, and if they are nearer than ten feet to an opposite wall these noises become very undesirable, as they are echoed and amplified.

Development of Natural Lighting in Schools

In 1866 Hermann Cohn suggested, after some studies of ease of reading and actual performance of the eyes, in Europe, that the window area in every schoolroom should be at least one-fifth of the floor area.

Javal, in France, stated that the sky should be visible from every part of the schoolroom and that the school should be separated from neighboring buildings by twice the height of these buildings.

In 1882 the French Department of Education ruled that a section of the sky must be seen equal to thirty square centimeters from the top of the window at each scholar's desk.

Forster, in 1884, suggested that for any desk, the angle between a line drawn from the top of the window and another to the top of the nearest buildings should be four degrees minimum.

In 1883 Weber introduced the photometer as a measure of illumination by comparison of a standard light with the unknown light. After some studies with the Weber Photometer, Cohn concluded that the minimum requirement for lighting a school desk is fifty reduced square degrees of sky vault. The square degrees of sky vault is the area of the sky visible from the desk measured in degrees. The length and width of this sky area visible are measured in degrees of the angle subtended by a point on the desk, and the

length times the width equals square degrees. The reduced square degrees is the square degrees of area multiplied by the sine of the angle of elevation of the visible sky vault. This is due to the cosine law; the sine of the angle of elevation is the cosine of the angle between the normal to the beam of light and the surface of the desk. Cohn computed that a desk having fifty reduced square

A well-lighted classroom.—Beaver Country Day School, Brookline, Mass.

degrees had an illumination of less than one foot-candle in bad weather.

In the United States, proper lighting was emphasized with the issuing of the Code of Lighting School Buildings under the joint sponsorship of the Illuminating Engineering Society and the American Institute of Architects. The joint committee (1926) recognized that the minimum requirements for illumination intensities vary with the type of work being performed.

A recent revision of the code is embodied in *Standards of School Lighting*, published jointly by the Illuminating Engineering Society and the American Institute of Architects, and approved by the American Standards Association. The standards closely follow the "minimum requirements" and "good practices" recently outlined in "A Program of Eye Health in a School System," published by the National Society for the Prevention of Blindness.

The latest recommendation for minimum natural lighting requirements for schoolrooms made in England will be found in the report of a committee of the Illuminating Society of England. This committee recommended a minimum illumination intensity of two and one-half foot-candles daylight for good lighting, and one foot-candle for adequate lighting, with the suggestion that no desk from which no sky is visible is fit for use as a scholar's place. Another committee of the same society recommended five foot-candles for ordinary reading and eight foot-candles for drafting, sewing, etc., as the minimum illumination intensities when using artificial light.

Minimum Light Intensities

Researches in conditions necessary for proper visual functioning have been going on since before 1800. The question of minimum light intensities which permit reading without injury to eyesight, especially for children, remains unanswered, due to the large number of variables involved in the process of seeing.

Dr. L. F. Troland found, from reviewing the literature from the earliest times up to and including the year 1926, that a minimum level of intensity could not be applied equally well to all visual tasks. He concluded, however, that the vast majority of industrial operations, which may also include school work, could be carried out at a maximum efficiency with an illumination intensity of about ten foot-candles. He also noted that many operations where contrasts and sizes of details are not of threshold dimension could be done equally well at one foot-candle. Troland also noted that, in general, past investigations showed increasingly better visual performance as the illumination intensities became higher, provided excessive contrasts were avoided.

Since 1926 Luckiesh, Cobb and Moss have been extremely active

in attempting to put the science of seeing on a rational basis. Cobb and Moss have expressed seeing as a function of the four fundamental factors: size of the object, contrast of the object with background, brightness of the object, and time of exposure of the object.

Doctors Ferree and Rand, of the Wilmer Ophthalmological Institute, have also contributed much excellent information to this important problem.

Window Design

The first experimental work of which we have a record was done by Hermann Cohn in 1866. He suggested that for proper daylighting the window area in every schoolroom should be at least one-fifth of the floor area, and it is interesting to note that the current practice in the United States is in the majority of cases an elaboration of Cohn's suggestion. According to Peskin, another suggestion made by Cohn in 1884, that the visible sky subtended at any desk should not be less than fifty reduced square degrees, is also found in many of the present day codes of lighting.

A good example of a carefully planned, successfully lighted school building is located in the Chestnut Hill section of Brookline, Massachusetts. The head master, and an authority on school construction, explained, in an interview, that before building the school, he studied the schools of several countries, particularly those of Germany. In order to study the best lighting for this latitude and longitude, an experimental room on a double revolving platform was built, and a searchlight was used to represent the sun at different times of the day, at the various seasons of the year. It was found that the east exposure was best for the more important classrooms. Next best was the west exposure. On the east exposure the room was flooded with sunlight early in the morning, and the rest of the day a clear east light was available without glare. A southern exposure was not good because when the sun shines on the pupils, the teacher must pull down the shades and then good lighting is not obtained.

The school was equipped with special wide-mesh, loose-woven, white canvas shades, so that the shades may be drawn to keep out the sun glare without shutting out all of the light. The shades

are arranged so they may be adjusted up or down from the middle of the window.

The windows extend to the very ceiling, and occupy the entire left wall above the desk line, with the exception of seven feet adjacent to the front wall. This exception is made in order to avoid glare on the blackboard, and in order to provide a space into which the pupils may look which is devoid of harsh light. The window supports are narrow to secure the maximum light, and to avoid objectionable shadow bands.

The width of the room is less than twice the height of the windows. By this arrangement the pupils in the row farthest from the windows have satisfactory light, except on dark days when artificial light supplements the natural light. With this requirement in mind, each row of electric lighting units is on a separate switch.

The ceilings are of rough white finish and the walls are light buff. In order to avoid monotony of color in the halls and in the rooms that are used only for short periods, various colors are used for decoration, but white ceilings and buff upper walls are retained. The lower part of the desks, and the floors are of dark color and do not reflect light up into the eyes. This plan is copying nature which provides unreflecting greens and browns underfoot.

There is a desk in the rear of the room for the teacher, so that she also has proper light from the left. Each teacher is instructed not to stand to the left side of the room in front of the windows in addressing the class, because then the pupils must twist in their seats and must face the strong east light if they are to look at the teacher.

There has recently been considerable discussion concerning the use of ultra-violet ray transmitting windows in schoolrooms. It is possible, of course, to obtain pure quartz glass that will freely transmit ultra-violet rays. However, there are certain facts that must be considered. Pure quartz glass is very expensive and glass that can be obtained for this purpose within reasonable limits of cost is at best only sixty per cent efficient and tends to depreciate with use. Dr. Walter H. Eddy, in his work in schoolroom tests in Bronxville, New York, using rats as subjects, found that only those in the direct rays of the sunlight are benefited. Janet Clark,

in a report in 1928, stated that children could get more ultra-violet radiation by being outdoors for a few minutes' recess than all day inside a room behind these windows.

Natural Lighting in Industry

From a code of lighting for factories, mills and other work places, prepared under the sponsorship of the Illuminating Engineering Society and issued by the United States Bureau of Labor Statistics, the following information is obtained: In practice, it will be found that the natural illumination on clear days is frequently many times the amount of actual number of foot-candles needed: in fact, an illumination of a hundred foot-candles can be found in almost any shop if measurements are taken near the window, and very often mechanics find it worth while to avail themselves of this illumination by walking over to the window whenever extremely accurate measurements are to be made. In this connection it is of interest to note that the range of illumination under which the eye can function with some degree of success is extremely wide, varying from a few hundredths of a foot-candle in the moonlight up to as much as 10,000 foot-candles out in the sunlight on a clear day. However, wide extremes in illumination are ordinarily not conducive to best vision.

Most factory owners are particularly interested in making the best possible use of their daylight facilities, so as to render useful and valuable all parts of the floor space; and also to shorten the periods when artificial lighting is needed. The saw-tooth sky windows of modern factory construction permit an adequate and nearly uniform daylight illumination of the entire floor area, and are desirable when practicable. When rooms are illuminated through side windows, it is often difficult or impossible satisfactorily to light all parts of the floor space; one part of the room has too little light, and the other is often subjected to objectionable glare. In some cases the use of prismatic glass which redirects the rays of light so as to admit more daylight into the room, especially into the parts of the room remote from the windows, is worth while. As a rule it is better to confine prismatic glass to the upper sash of the window, as its use in the lower sash is likely to cause objectionable glare; moreover it cuts off all view of out-of-doors.

Windows should be equipped with adjustable devices so that the illumination may be accommodated to the changing exterior conditions. Translucent window shades of light tones constitute the most important of these devices. Window shades or other daylight-adjusting devices should not be left to the mercy of those workers who may be nearest the windows, but should be controlled by the room foreman. He should readjust the window equipment for the varying daylight conditions, and he should also decide when the use of artificial light is necessary to make up for a deficiency in daylight in any location.

Because of the time required for the adaptation of the eye to its surroundings, special danger is present when one steps from outdoor sunlight into a dimly lighted storage space; for example, a passageway connecting two well-lighted areas must be well illuminated. Again, where the eye has been afforded the advantages of a high level of illumination throughout the day and artificial light is turned on to reinforce the failing natural light, a higher total illumination is ordinarily needed than at night under artificial lighting alone.

Luckiesh claims that the omission of windows with the substitution of artificial illumination in the place of natural light will reduce the heating cost in industrial plants. This, however, is somewhat exaggerated, for the average square foot of wall surface in a factory will allow at least one-fourth of the heat loss that a square foot of window will. The wall area involved would serve only for two purposes; thermal insulation and protection against conditions outside. Although the window has only one-fourth of the insulating ability of the wall, it protects against outside conditions to a considerable extent, especially in keeping out the weather, and, in addition, furnishes light and a means of ventilation. The difference between the cost of the natural and the artificial illumination greatly offsets the cost of extra heating. Many factories do not use their heating systems while the machinery is in operation and are glad to have excess heat escape.

Another argument for the exclusion of windows from factories is that undesirable noises will not be emitted from them. From a public health point of view does it not seem inconsistent for men to be exposed to noise so loud that it cannot be tolerated outside

the factory? Such problems should be taken care of by the proper acoustical design of factories and not by window elimination.

The Fenestra Method

The "Fenestra method" is based largely on work done at the University of Michigan by Randall and Martin, who were connected with the Detroit Steel Products Company's research fund established in 1923. They incorporated the theoretical and laboratory studies of Higbie, who was also connected with the research fund work, and their own experimental work, both in the field and in the laboratory.

This method of predetermining daylight consists of a series of tables and charts showing the variation in illumination as one moves away from the windows of various sizes. Illumination values are given assuming the brightness of the window source as two hundred candle-power per square foot inside of clean glass, which brightness is a minimum equivalent to a "gray day," or just before a rain. Correction factors are presented for dirt on glass, and light cut off by structural members. Other variables have been discarded with success in order to keep the method as simple as possible. In application, the minimum daylight at a point in question is given by noting from the tables the cumulative effects at that point of the various contemplated windows.

This method of predetermining daylight is unexcelled at the present time, having been successfully used by such firms as the General Electric Company, Bethlehem Steel Company and the Western Electric Company. It is applicable only to buildings using long lines of windows in large open rooms and, unfortunately, can be used only in the industrial type of building.

The Fenestra method is the most practical and usable one known today as proven by experience; but perhaps the best theoretical analysis of daylighting from windows is the so-called "protractor method" as worked out by Higbie. This method consists of plotting by means of angular co-ordinates the view of the sky, horizon and window as seen from the point in question on a specially prepared ruled paper. The ratio of the area of the paper gives the so-called "daylight factor" at the point, the area of the paper representing the area of the hemisphere of sky.

Location of Buildings with Respect to Natural Lighting

The natural lighting of any building, whether it is a home, office, school, or factory is dependent upon the available daylight. To give buildings adequate daylight it is necessary to space and to construct them properly. A few years ago our larger cities suddenly became conscious of the fact that they were burying their business districts in canyons formed by high vertical walls of skyscrapers. Veiller stated in 1920 that at certain times the Equitable Building in New York cast a shadow about one-fifth of a mile in length, covering an area of 7.59 acres, while the structure itself is only 493 feet high and covers 1.14 acres. He claimed that the shadow cut off all sunshine from the Broadway façade of the United States Realty Building, a structure twenty-one stories high. He also showed how other buildings cast similarly disproportionate shadows. On the street immediately north of the Equitable Building at noon on December twenty-first, not a single window within 447 feet of the street level would receive a ray of sunshine.

In order to check this ever-increasing "darkness," ordinances were passed requiring the new buildings to be set back at various heights. Those constructing the buildings began to realize the advantage of the setback in relation to office rental. The Empire State Building's first setback was made two stories below the required limit for this very reason.

The smaller cities began to feel the need for the regulation of the spacing of buildings and developed ordinances controlling the area on which various types of structures could be erected and also making suitable allowance for light to reach all the rooms.

Summary

Although glass windows came into general use in the eighteenth century, the science of natural lighting did not receive much attention until the last decade.

Hermann Cohn made some good recommendations for window area in schools in 1866.

Since 1926, Luckiesh, Cobb, Moss, Ferree, and Rand have contributed much valuable information in regard to light and sight.

Fairly satisfactory codes for school lighting are now available.

It is of utmost importance that correct window shades be installed and that they be used properly.

The saw-tooth type of factory is one of the best from the point of view of natural illumination.

The "Fenestra method," based largely on the work done by Randall and Martin at the University of Michigan, has proven very successful in the industrial field. Methods should be developed for other types of buildings that would allow natural lighting to be calculated by regular rules.

Building spacing and construction is very important in obtaining the proper amount of daylight.

Some Causes of Blindness*

T. H. Farrell, M.D.

AWARENESS of the more common causes of blindness increases the prevention of blindness worker's power to save sight

WE live in an epoch when men and women are increasingly alive to their responsibilities for prevention of blindness—from birth through the school career, mature life and old age. Those engaged in prevention of blindness work are constantly broadening their understanding of it to include eugenics, dietetics, prenatal care, good lighting, and good printing.

What is Blindness?

The dictionary defines blindness as the state and quality of being blind; that is, destitute of the sense of seeing, either by natural defects or by deprivation. This definition is not especially helpful. The English have a more practical definition, namely: in adults—failure to count fingers at ten feet; in children—failure to read school books. This latter definition is open to criticism, since it would mean sending many children to schools for the blind who simply need careful refraction and proper glasses to give them normal sight, or who should be in sight-saving classes where the sight they have may be utilized to the utmost without causing deterioration.

Hereditary Diseases

Of great importance and interest are those types of blindness which are hereditary. Education and environment have their influence upon the individual during his lifetime, but they do not change his hereditary equipment. In many cases, the only sure way to save children's sight is to choose their ancestors.

* Excerpt from an address, "The Prevention of Blindness Today," presented at the conference of the New York State Federation of Workers for the Blind, Utica, New York.

We know more about hereditary diseases of the eye than those of any other organ, and for the good reason that the slightest defects of the eye cause marked disturbance of function. It is probable that ten of the fifteen per cent syphilitic blind owe their condition to congenital syphilis. The eye involvement shows itself usually between the ages of five and twenty-five. If it takes the form of interstitial keratitis, the child complains of photophobia, with redness and haziness of one or both corneas. After months of treatment, the cornea may become clear and the vision restored. Frequently, the cornea remains hazy and the sight varies from slight impairment to complete blindness. Only recently we saw two children from the same family with this trouble, one seven and the other nine. Wassermann tests of the rest of the family showed the older children free from the disease. The father and mother are now under treatment so that their own eyes may be protected and so that any more babies may be saved from suffering and from defective vision. Fortunately, these two children came through with reasonably clear corneas, though with a permanent disability. Other forms of inherited syphilis are choroiditis, with destruction of the retina; and congenital or juvenile optic atrophy. This disease can be entirely prevented if Wassermann tests are made on all pregnant women and treatment instituted before the fourth month —not by any means an impossible objective.

The genetics of the myopic group have not been fully disentangled, but we may say that dysgenic births are the chief cause of severe myopia; some high myopes go blind and there are many whose very defective vision is almost equivalent to blindness. A possible sequel to high myopia is detachment of the retina, which is the separation of the retina from its choroid bed. Of course, detachment may follow an accident to normal eyes, as well. It develops suddenly and the patient speaks of seeing over a wall, or of a curtain coming up, or down, before the vision of the affected eye. Externally, the eye appears to be normal.

Retinitis pigmentosa is an atrophy of the retina. It begins in early youth and progresses to complete blindness sooner or later—often around the age of forty. A third of those thus affected owe their condition to consanguinity of their parents.

Optic nerve atrophy, in the hereditary form, comes on suddenly

about the age of twenty. It hardly ever leads to complete blindness. It goes under the name of "Leber's disease," and, if once diagnosed, the family should be warned of its hereditary character.

Congenital cataract is usually of the lamellar type. It may occasion sufficient grayness of the pupil to attract attention at birth, or it may not be discovered until the child goes to school. In schools for the blind 13 per cent of the pupils are there because of cataract.

In glaucoma, the hereditary factor is not always very marked, though congenital glaucoma does occur and there is a probable hereditary predisposition to it in many other cases. Two definite types of glaucoma are recognized. The acute one is frequently ushered in by an attack of nausea and vomiting. It has been variously diagnosed as "sick headache" or "blind headache." The eye affected is always darkly congested. Unless it is promptly recognized and an operation performed within forty-eight hours of the onset, it is likely to result in blindness. The other type is one of the most serious of all eye diseases, because it comes on without manifesting either pain or redness. The field of vision gradually contracts and usually the last portion of sight to be lost is good central vision. The patient may be unconscious of this disease until he accidentally covers the unaffected eye and then finds the other is blind. Many people are suffering from this disease, which most frequently occurs after the age of forty. Whatever may be its cause, associated conditions frequently indicate diabetes, liver trouble, arteriosclerosis, kidney disease and high blood pressure, all of which could be recognized early if a thorough physical examination were made at yearly intervals. Persons who test eyes for glasses should be on the lookout for this dread disease and promptly refer patients requiring frequent change of glasses and those having any uncorrectible defect of vision to a competent ophthalmologist.

In all these cases which we have enumerated, where an eye disease, hereditary in tendency, is recognized, the individual should be warned that it may recur in his or her offspring. Unfortunately, that is as far as we are permitted to go at present.

Prenatal Care

Much has been written of the importance of prenatal care. This is of importance not only for the child but for the mother. There is

an increasing number of pregnant women who show evidence of toxemia. Frequent ophthalmic examinations as well as frequent examinations of the urine are important for its early diagnosis. If treatment is not promptly instituted, the vision or even the life of the mother is in danger.

A disease that more than any other in the past has filled our institutions for the blind is ophthalmia neonatorum or "babies' sore eyes." This is not always due to gonorrheal infection but, fortunately, a differentiation, as far as treatment is concerned, is not important. You are all familiar, I am sure, with Crédé's discovery that the use of a solution of one per cent nitrate of silver instilled in the conjunctival sac as soon as the baby is born will almost surely prevent blindness of the newborn. If there is any inflammation in the baby's eyes at any time, a competent eye specialist should be consulted and no pains spared to clear up the inflammation as soon as possible. I understand that the New York State Commission for the Blind stands ready to provide properly trained nurses in case of necessity. The reduction in the number of children afflicted by this disease, in the schools for the blind, from 25 per cent to 7 per cent in the last twenty-five years is a fine piece of work. Of course we should not be satisfied until the percentage approximates zero.

Focal Infection

Focal infection is a prolific cause of eye diseases. In such cases a localized area of disease occurring in remote parts of the body gives rise to an iritis, choroiditis or a retinitis, which may terminate in blindness. The most frequent sites for these focal infections are the teeth, tonsils, nasal sinuses, intestinal tract and the genitourinary organs. This is only one more illustration of the importance of a periodic health examination. If the dentist should be seen twice a year, surely once a year is not too often for a checkup by the family physician.

Tuberculosis

Another prevalent disease which may involve any part of the eye and yet may not be accompanied by an involvement of the lungs is tuberculosis. It may give rise to phlyctenular keratitis, iritis, retinitis and choroiditis. Though frequently intractable, it is not

so destructive as similar trouble occasioned by syphilitic infection. Many children are seen with photophobia in which the dread of light is extreme—quite as severe as in interstitial keratitis due to syphilis. This may be due to phlyctenular disease of the cornea which is frequently regarded as a manifestation of tuberculosis. If so, it differs from other forms of tuberculosis (as well as from syphilis) in being readily amenable to treatment. Regulation of the diet and attention to the gastro-intestinal tract, with ordinarily good hygienic surroundings, in my experience, have invariably cured these little sufferers—for it is pre-eminently a disease of childhood. If neglected, attacks recur, each one leaving its mark on the cornea in the form of a scar, until the cornea may be so clouded as to impair the vision seriously.

Infectious Diseases in Childhood

The infectious diseases of children have lost much of their importance in relation to blindness. Smallpox is almost unknown in our time, thanks to the prevailing regulation which requires all school children to be vaccinated. Diphtheria can be eradicated if only parents will co-operate with the health department in the use of toxin-antitoxin. Scarlet fever affects the vision only when kidney complications occur. Measles may occasion great discomfort during the onset and height of the disease, but seldom leaves any permanent injury in its train. It may initiate or aggravate symptoms due to eyestrain from refractive errors.

Trachoma

Trachoma is still the chief cause of blindness in some countries. In China, alone, it has been estimated to have blinded one million, affected three to four million in one eye, and to have seriously impaired the sight of twenty million of a population of four hundred million. We are fortunate in this country in having trachoma controlled by the immigration laws which prohibit anyone with trachoma from entering the United States. Despite this, it is prevalent in some sections, especially among the foreign-born and in certain of the Indian tribes. Also, sad to relate, among the mountain whites of Virginia and Tennessee the disease has been propagated because of ignorance and neglect ever since the early settlers found lodgment there.

Cancer

So-called cancer may occur in the eye and is most destructive. The most usual form occurs in adult life as sarcoma of the choroid. It is not suspected until it occasions a defect in the field of vision, recognized by the patient as a cloud which partly obscures the sight. At this stage it may occasion a detachment of the retina, which complicates the diagnosis. If the diagnosis is correctly made and the eye promptly removed, there is no extension. If allowed to remain, the eyeball becomes inflamed and painful and eventually blindness ensues. The last stage is that in which the tumor extends beyond the confines of the eyeball and fills the orbit. It then gives rise to similar growths elsewhere in the body; the disease is fatal. Another form of cancer is carcinoma. If it occurs in the back of the eye, it is, in the majority of instances, secondary to a similar growth elsewhere in the body. Hence, even if diagnosed early, removal of the eye is not attended by such a fortunate result as in sarcoma.

There is still a third form of malignant disease which occurs only in infants; it is called glioma of the retina and in some families is suspected of being hereditary. Parents first notice a yellowish reflex from their child's pupil. This is characteristic of the disease. Early removal is the only hope of saving these children from a horrible death. The only exception to this rule is that, when both eyes are involved, radium may be tried.

Danger of Drugs and Cosmetics

Certain drugs used in medical practice will destroy the sight by causing atrophy of the optic nerve. One of these is quinine in large doses. A similar effect is brought about by certain chemicals used in industry, such as lead and arsenic, also compounds containing tetrachloride used by cleaners and dyers. In this connection we might mention the susceptibility of some individuals to the excessive use of grain alcohol and tobacco, causing optic nerve atrophy. This can be recognized and combatted. The same is not true of wood alcohol, which is acutely destructive of sight and even of life itself.

Of late much has been seen in medical literature of the danger to eyes from cosmetics. These dyes may find their way into the eyes,

setting up an inflammation of the conjunctiva and cornea. If their use is not promptly discontinued and the inflammation properly cared for, blindness may ensue. Other patent preparations for the removal of hair from exposed parts of the body may be very harmful. Such a one is Koremlu, which contains thallium. Being absorbed, it may affect the optic nerve and cause blindness.

Accidents

In the field of accidents the causes are almost too numerous to mention. Flying particles of emery, steel, copper, stone, wood, glass, etc., may lodge in the cornea and if not removed with proper care, may result in ulceration with varying degrees of visual loss. If the foreign body penetrates to the inside of the eyeball and remains there, it is likely to give rise to sympathetic inflammation in the uninjured eye, and may lead to blindness.

Besides the list of articles just mentioned, children's eyes are often injured by sharp-pointed toys and scissors and knives. A case of this kind occurred in our own practice many years ago. A young lad of six years of age was using his mother's scissors to untie his shoelace when they slipped and the sharp point penetrated one eye at the margin of the cornea. The peculiar shape of the pupil attracted the mother's attention and she brought him in for treatment. A simple operation was performed and the eye apparently made a perfect recovery. Some months later the eyes began to have periodic spells of redness and when, finally, the mother brought him back to us, sympathetic ophthalmia was well established. As a result, he lost the sight of both eyes.

We might mention burns of the eye from molten iron and lead; from electric flashes and the acetylene torch; from such chemicals as caustic soda, lime, corrosive acids and tear gas.

Then too, firearms take their toll of sight, especially those used in shooting birds. In our experience, one small birdshot penetrating the eyeball was destructive to sight. Airguns in the hands of children are a frequent cause of eye injury. Of course fireworks have been responsible for many blind or partially blind eyes. Fortunately the long campaign against them is now nearing a successful termination.

Sight Conservation a Hopeful Effort

Safety first campaigns have yielded large dividends in the prevention of injury to the eyes both in the workshop and on the highway. Employers and insurance companies in conjunction with the State Departments of Labor and Compensation have contributed their share in protecting the workers. Goggles are provided for the workmen using grinding machines or emery wheels, where flying particles are a menace to their eyes; and to those exposed to noxious fumes. Properly tinted glasses are supplied for those exposed to the flame of the acetylene torch or electric flashes. The lighting in factories and mills has been improved and care is taken that the individual employee has not only the proper amount of light on his work but that it comes from the proper direction.

Architects and builders are giving more consideration to the problem of proper lighting in the home and in the school. Boards of education, following the lead of the State Department of Education, have accomplished wonders by enforcing a system of school inspection for the detection of visual defects and of contagious eye diseases.

This is but a brief survey of some causes of blindness and the present means of prevention. The biggest problem that confronts us is the elimination or control of the so-called venereal diseases, gonorrhea and syphilis. The joining of medical and social forces in a successful drive against these diseases will in the next twenty or twenty-five years yield results as spectacular as any that have gone before.

The Social Significance of Better Sight*

James E. Ives

EFFICIENCY in production is greatly aided by promoting visual efficiency among workers, according to studies made by the United States Public Health Service

I THINK that I remember having read somewhere that ninety per cent of our knowledge of the outside world comes to us through our eyes. Certainly, our knowledge of the sun, the moon, and the stars comes to us in this way. If it were not for our eyes, the rose would have no color, there would be no greenness to the sea, and not only no blueness to the sky, but there would be no sky. If it were not for our eyes, we should know objects only by their feel, their weight, their odor, their taste, and the noise that they make. The world we build up around us, in our imagination, would be poverty stricken. There would be no sunrises or sunsets, no far horizon on the desert or on the ocean, no brightly colored flowers in the springtime. Our world would be small and gray.

Our sense of sight is the most important of our contacts with the world outside us, and, indeed, with the world of radiant energy in which we "live and move and have our being." We live in a bath of radiation surging around and through us, whose waves range in length from the very short waves of the cosmic rays to the long waves of radio. The radiations of light and heat are perceived by us directly, other forms of radiation only indirectly.

It is seldom that we stop to think how valuable this great gift of eyesight is to us. It is only when something unusual occurs that we awake to its importance. Recently, a dear friend of mine suddenly became blind in one eye through the detachment of the retina from the choroid. We knew that he was a myope, but did

* Presented at the conference of the National Better Light-Better Sight Bureau, New York; published also in a current issue of *Guildcraft*.

not anticipate the catastrophe that has befallen him. Was the myopia produced by too intensive use of his eyes, or by poor illumination, or by both together? Possibly, with better care of his eyes and better illumination, this unfortunate event might have been avoided.

The care of the eyes and proper lighting are very practical matters. As an example, I may mention a recent co-operative study carried on by the Port of New York Authority and the United States Public Health Service. The Port of New York Authority became interested in the possible use of the recently developed sodium vapor lamp in the mid-town tunnel which they are now building under the Hudson River. These lamps have the advantage of being twice as efficient in their lighting output as tungsten lamps, and give a soft, diffused illumination. But the question arose in the minds of the officers of this organization as to the possible injurious effect of the yellow light of these lamps upon the eyes of men employed in the tunnel. They, therefore, suggested to the United States Public Health Service that a study be made to determine the effect of these lamps upon eyesight. A co-operative study was finally arranged, employing, as a Civil Works Administration project, twenty-three men doing clerical work: twelve working under sodium vapor lamps, and eleven under tungsten. The study extended over a period of twelve weeks. Periodic examinations of the eyes were made during this period. No injurious effect of the sodium light on the eyes of the workers was observed, and the men who worked under the light liked it, characterizing it as soft and easy on the eyes. It appears, therefore, that so far as any possible injury to the eyes is concerned, these lamps can be used with safety.[1]

In considering the "Social Significance of Better Sight," I looked up the definition of "social" in Webster's dictionary, and found that the dictionary, in defining this word, says, "of or pertaining to companionship or mutual relationship. . ." The problems of good lighting and protection of the eyes are of mutual interest to us all, as witness the glare of headlights in night driving on country roads; insufficient lighting of roads, especially in the country; and insufficient and improper lighting of our public libraries, schools, workshops, offices and homes. Insufficient or improper lighting in

the schoolroom, such as too small or improperly placed windows, improperly placed blackboards, or insufficient artificial illumination, will produce a strain on the eyes of the growing child and, if the child is naturally myopic, will undoubtedly injure his eyes. The clerk and industrial worker also must have proper and sufficient illumination upon their work if their eyes are to be protected. In this connection, I propose to present for your consideration the results of some of the studies carried on in recent years by the United States Public Health Service on illumination in relation to eyesight in schools and industrial establishments.

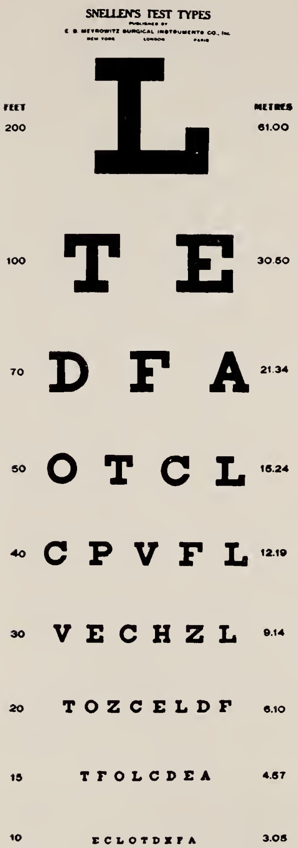

Figure 1.—Snellen Test Card. Reduced to one-sixth of standard size.

The most common method of determining the vision of individuals in large groups is by the measurement of visual acuity with the Snellen test card. On this card (Figure 1) there are successive lines of letters, the letters of any given line being all of the same size and the letters of successive lines smaller than the letters of the lines above them. The subject whose eyes are being examined is placed at a distance of 20 feet from the card, and the examiner determines the line of smallest type that the subject can read. The letters of the successive lines on the card are of such a size that each letter subtends an angle of five minutes at a given distance. Nine distances are used, varying from 200 to 10 feet. Notations of these distances are placed opposite the corresponding lines. If a subject can read the line for 20 feet, his vision is said to be 20/20. If his vision is so poor that he can only read the line for 50 feet, his vision is said to be 20/50. If his vision is so good that he can read the line for 15 feet his vision is said to be 20/15. Vision of 20/20 is taken as a sort of a standard, just as a height

of 5 feet 7 inches might be taken as the standard height for a man. I wish to emphasize the fact that 20/20 vision is not "normal" vision for man, in the ordinary sense of the word normal, any more than a height of 5 feet 7 inches would be the normal height for a man. Men may vary normally in height from 5 to 6 feet, and so visual acuity may vary normally from 20/30 to 20/15 depending upon age, occupation, race, etc. It may be pointed out that visual acuity, as measured with the Snellen test card, is affected by various defects of the eye, such as myopia, hyperopia, presbyopia and astigmatism, and also by the various diseases of the eye. You will realize, therefore, that visual acuity, as measured with the Snellen test card, is a very broad and inclusive, and rather indefinite, index of vision.

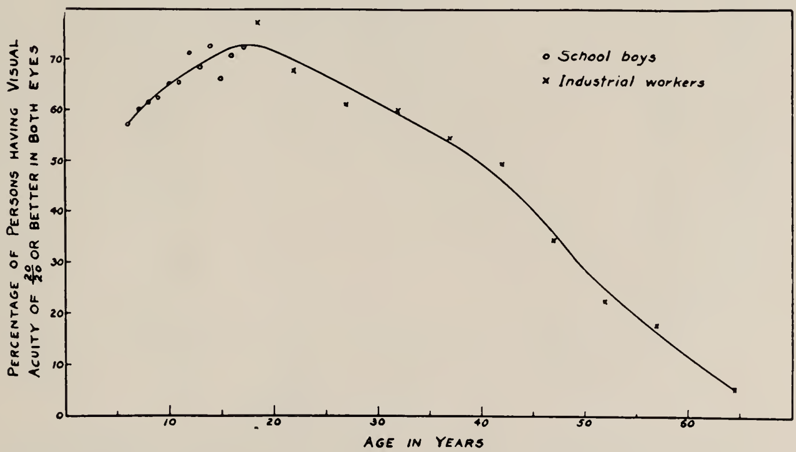

Figure 2.—Variation of visual acuity of children and adults with age.

Figure 2 shows how visual acuity, as measured with the Snellen test card, varies with age. The results shown were obtained from measurements made on some 5,000 white school boys and some 6,500 white males employed in nine different industries.[2] The curve shows the percentage number in each age group of these boys and workers having a vision of 20/20 or better in both eyes. It is evident from the curve that visual acuity, measured in this way, increases, on an average, from six years of age to about 18 years, then decreases rather rapidly to about 43 years of age, and then

more rapidly to about 65 years of age. The curve suggests that there is a normal variation with age, which is more or less independent of the way in which the eye is used and of the degree of illumination under which work is performed. The average visual acuity of a group of individuals of a given age, having normal vision, and living or working under conditions not involving intensive use of the eyes, might perhaps be taken as the "normal" visual acuity at that age. The increase of visual acuity from birth until about 18 years of age, shown in Figure 2, is very significant.

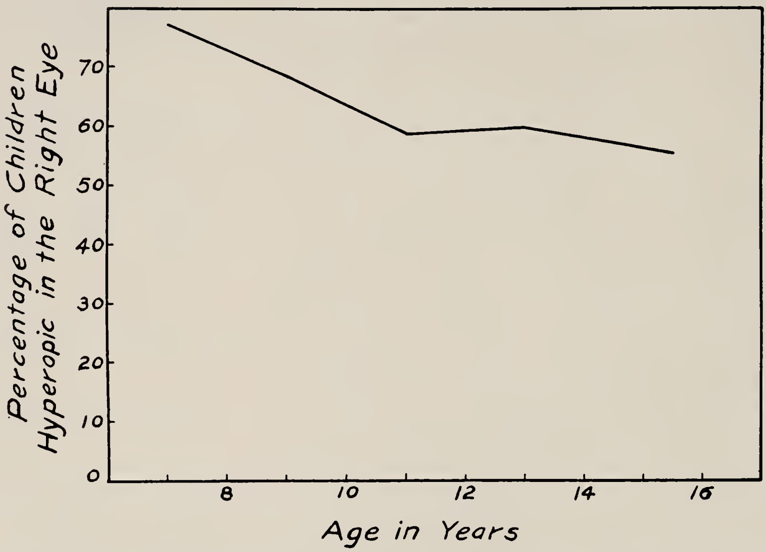

Figure 3.—Prevalence of hyperopia among school children of different ages. The data refer to the right eye, but the left eye shows approximately the same results.

This increase of visual acuity during the early years of life certainly cannot be attributed to either the goodness or poorness of the illumination under which children live, play and work. It is due primarily to the fact that at birth the eye of the child is highly hyperopic and that this hyperopia diminishes as the child grows older. The high incidence of hyperopia in the young child and its decrease as the child grows older is shown clearly in the curves of Figure 3, which give the results of a study of white school children in Washington.[3] It will be seen that the number of children

having hyperopic eyes decreased from about 80 per cent at seven years of age to about 55 per cent at 15 years of age.

In Figure 4, the 6,500 white workers whose average visual acuity is shown in Figure 2 have been separated by occupations,[4] and the curves show not only the decrease of visual acuity with age, but the effect upon visual acuity of occupation. It will be noted that

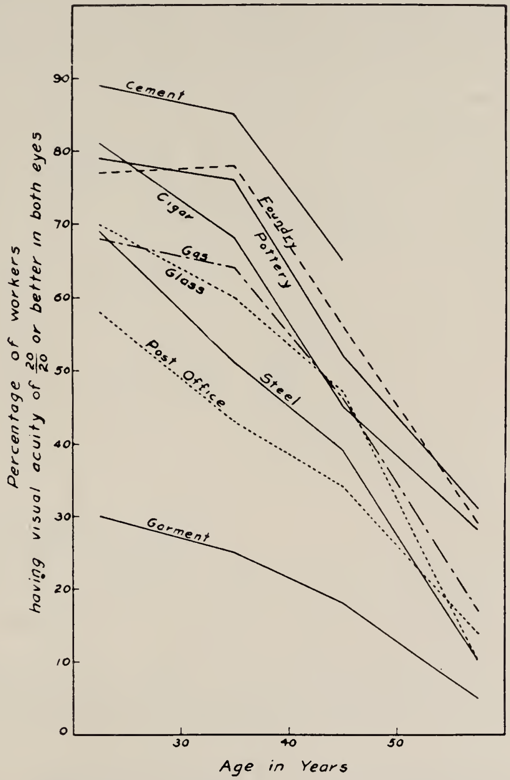

Figure 4.—Variation of visual acuity of industrial workers with age for different occupations.

in occupations such as the cement, foundry and pottery industries, industries requiring only a small amount of concentration of vision, the average vision is very much better than in an occupation such as the garment industry, in which great concentration of vision is required. In the latter industry, the low level of vision may be due either to insufficient illumination or to the nature of the eye

work, or to both. It is very evident, however, that as high a level of illumination as possible should be provided for eye work in an occupation, such as that of the garment workers, in which great concentration of vision is required.

Besides the points brought out by studies of visual acuity, studies made by the Public Health Service have shown three important relationships between illumination and eyesight.

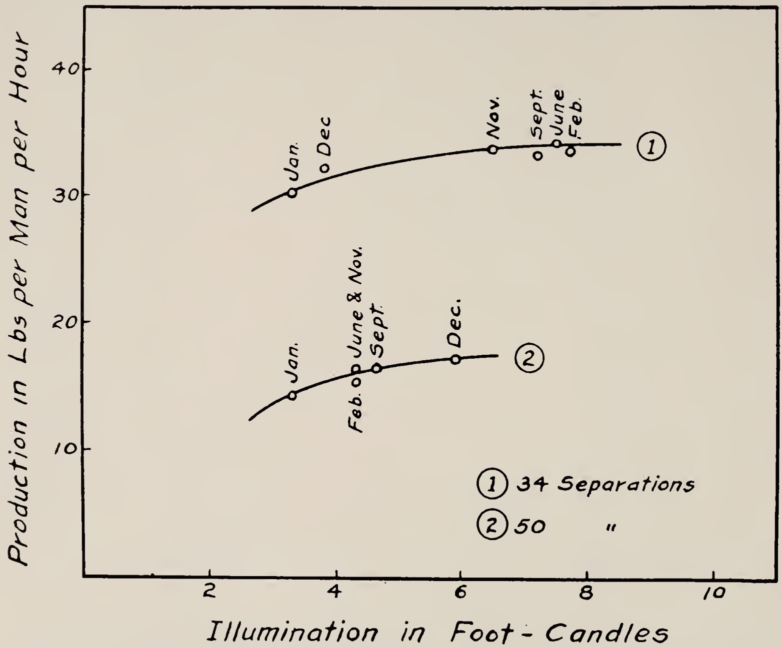

Figure 5.—Relation of production to intensity of illumination in the New York City Hall post office.

1. Increase of illumination increases production.
2. Increase of illumination increases the normal visual acuity of the worker.
3. Increase of illumination decreases the incidence of eye defects.

The effect of increased illumination on production is seen in Figure 5, which shows the results of studies made in the New York City Hall Post Office on the effect of increased illumination on the amount of mail sorted by letter separators.[5] The curves of this figure give the results of tests made for two different types of

sorting of mail. The upper curve gives the results for work necessitating 34 separations of mail, and the lower curve for work necessitating 50 separations. In both cases it is evident that there was a marked increase in the amount of mail sorted per man per hour as the intensity of the illumination was increased.

Even more interesting than the effect of increased illumination upon production is its apparent effect upon the everyday visual acuity of the men working under it. This is shown in Figure 6, which is taken from a report on a study made at the Chicago Post Office.[6] The method of measuring visual acuity used in this study was somewhat different from that of the Snellen test card, since

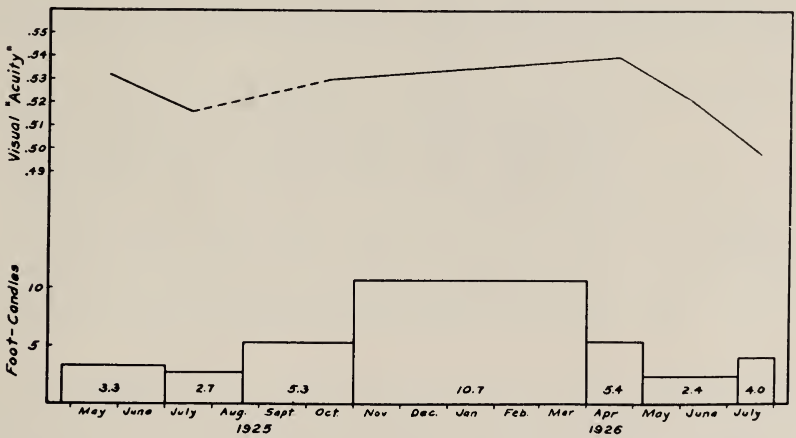

Figure 6.—Effect of intensity of illumination upon everyday visual acuity.

in this study we used as the test object the international broken circle, exposed only for about one-hundredth of a second. The tests extended over a period of about fifteen months. It will be noted that when the illumination under which the subjects worked was decreased, their everyday visual acuity decreased, and when the illumination was increased their everyday visual acuity increased. These results, therefore, appear to indicate a definite relationship between a worker's everyday visual acuity and the illumination under which he works.

The effect of the intensity of illumination on the incidence of eye defects is shown by the studies on lighting carried on in the New York Post Offices.[7] Two post offices, differing markedly in levels of

illumination, were chosen for the study—one, the City Hall Post Office, which was old and in which the lighting was antiquated, and the other, the General Post Office, which was relatively new at that time and in which the general level of illumination was higher. The two post offices were comparable in the age distribution and years of service of the employees. The prevalence of defects and diseases of the eye was in general found to be much greater in the City Hall Post Office than in the General Post Office. A comparison of certain eye conditions in the two post offices is shown in Figure 7. It will be noted that the percentage of employees having certain defects of vision was much greater in the older post office, and also that the percentage of employees having 20/20 vision was in general greater in the newer post office.

Post office.	Normal vision in both eyes with no defects.	Normal vision in both eyes with defects.	Normal vision in one eye only.	Normal vision in one or both eyes.	Defective vision in both eyes.	Refractive errors.	Inflammatory conditions.	Muscular unbalance.	Asthenopia.
City Hall	10.3	29.5	17.8	57.5	42.5	76.6	20.9	33.4	16.5
General	19.8	29.9	17.6	67.4	32.6	72.5	11.9	22.4	5 7

Figure 7.—Percentage of the 2,449 employees examined in the New York City Hall and general post offices, with certain eye conditions.

The material that I have presented for your consideration will indicate the great interest taken by the United States Public Health Service in the provision of sufficient and proper illumination in the home, the school, the workshop and the office, for the protection of the most valuable possession of our fellow citizens—our eyesight.

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The Co-operation of the Physician and the Safety Engineer in Saving Sight

C. O. Sappington, M.D., Dr.P.H.

THE collaboration of the industrial physician with the safety engineer is required for an efficient program of sight conservation in industry

A GREAT deal of attention and time have been given to the gathering of figures regarding the occurrence of eye injuries and the cost of them. It seems useless to take up time and space and quote such statistics further. It is significant that more money is paid each year by employers in compensation for eye injuries than for injuries to any other part of the body. It should also be emphasized that the value of sight makes an injury to the eye a very costly single item.

For the purpose of this discussion, injury means not only the results which take place mechanically but also those which occur from exposure to excessive light and heat, various poisons, chemical and heat burns, excessive eyestrain, and improper lighting.

It may be obvious, but one may well risk repetition in stating that the principles of sight saving should properly include a knowledge of the effect of general systemic body conditions on the eye, the intelligent exercise of care in the use of the eye under varying conditions, in addition to the provision of protective measures against the well-known kinds of eye injuries.

We, therefore, have for our consideration a very broad problem. In the approach to the discussion of this problem it seems wise to include a discussion of what the physician should know; what the safety engineer should know; the essentials of co-operative effort; the practical results that may be achieved, and the conclusions which may be reached through a discussion of these sub-topics.

What the Industrial Physician Should Know

Perhaps at the outset it would be well to agree that every plant physician cannot be an eye specialist; but it is of equal importance to assume that every plant physician should be able to recognize (before it is too late) a dangerous reaction, necessitating the immediate service of a skilled ophthalmologist. Herein, I believe, lies one of the essentials of the prevention of loss of sight.

It seems reasonable to expect the physician to know what the ordinary eye injuries are, such as cuts, piercing wounds, contused wounds, burns; how they are caused; and their effects and treatment. The physician should also have a knowledge of the diseases caused by excessive eyestrain—such as nystagmus, spasm of the ocular muscles, and the results of eyestrain encountered in occupations requiring prolonged use of the eyes. Excessive exposure to light and heat, such as in welding, in glasswork and furnaces, in the constant gazing at bright objects, and in the exposure to electric flashes, affects the eyes. Certain poisons affect the vision, such as methyl alcohol, amyl alcohol, tobacco, arsenic, carbon bisulphide, lead, materials used in the manufacture of explosives, aniline, and the occupation of tea-tasting.

It also seems wise that the physician should know what the possible hazards to the eye are in the processes and the use of materials in the plants where he is the medical supervisor. In this way he may, in his co-operation with other plant officials, approach the problem of prevention of eye injuries in an intelligent way.

As an example of the specificity of eye injuries and their complications, Dr. Paul D. Moore, in an excellent discussion of eye injuries and their treatment, has called attention to the various degrees of injuries which may result from a single accident due to mechanical causes: (1) the cornea only may be cut through; (2) in addition to cutting the cornea, the iris may be cut and a portion of it dragged out through the corneal wound; (3) the lens may be punctured, resulting in a cataract; and (4) the foreign body may enter the posterior chamber of the eye. In the further discussion of other types of eye injuries Dr. Moore comes to the reasonable conclusion that every eye accident is a distinct problem in itself as to treatment and result.

The question of goggles has been one of great interest and much has been written and said on this subject. The physician surely should have a reasonable knowledge concerning the proper use of goggles, and their selection and adaptation to various plant problems.

What the Safety Engineer Should Know

As an excellent basis for the acquisition of further knowledge on eye protection by the safety engineer, the National Safety Code for the Protection of Heads and Eyes of Industrial Workers can profitably occupy our attention. The results of twenty years' study of eye injuries, covering nine general groups of processes and operations, are given in this code, as follows:

Group A—Processes where protection from relatively large flying objects is required. Examples: Chipping, calking, and some riveting operations.

Group B—Processes where protection from dust and small flying particles is required. Examples: Scaling and grinding of metals, stone dressing, and some woodworking operations.

Group C—Operations where protection from dust and wind is required. Examples: Automobile driving, locomotive driving and firing, and electric spot and butt welding, where there is no exposure to radiant energy.

Group D—Processes where protection from splashing metal is required. Examples: Babbitting, pouring of lead joints for casting iron pipes, casting of hot metal if there is a possibility that water is present; and dipping in hot metal baths.

Group E—Processes where protection from gases, fumes, and liquids is required. Examples: Handling of acids and caustics, dipping in galvanizing tanks and some japanning operations.

Group F—Processes where protection from an excess amount of dust and small flying particles is required. Example: Sandblasting.

Group G—Operations where protection is required from reflected light or glare. Examples: Long exposure to snow-

covered ground, exposure to reflected sunlight from roofs, roadbeds, etc.

Group H—Processes where protection from injurious radiant energy with a moderate reduction in intensity of the visible radiant energy is required. Examples: Oxyacetylene and oxyhydrogen welding and cutting; open-hearth, Bessemer, and crucible steel making; furnace work, electric resistance welding, brazing, and testing of lamps, involving exposure to excessive brightness.

Group I—Processes where protection from injurious radiant energy with a large reduction of the visible radiant energy is required. Examples: Electric arc welding and cutting.

It is acknowledged that the examples given in this list are merely for illustration and are not intended to cover all contingencies. For instance, it is stated that goggles alone will not furnish proper protection for all the occupations listed in this brief grouping; in some processes, for example, a mask is necessary to protect both face and eyes; in sandblasting, helmets of special design are used, and in other instances gas masks or respirators are advisable in addition to specific types of goggles.

The safety engineer should certainly know what the processes are in his plant, and of the materials which are used, which might give rise to an accident affecting the eyes. He should likewise be acquainted with the different types of protective devices and their specific uses. He should give due consideration to the principles of lighting and their adequate application to the various sections of his plant. From time to time he should arrange meetings at which the revision of processes, the changing of methods, or improvement in lighting might be discussed with department heads and officials.

The safety engineer should not be required to know anything about various diseases of the eye, nor should be concern himself about the medical and surgical treatment of eye injuries and their complications—this is quite properly the province of the physician. The safety engineer can, however, discourage all attempts by employees to treat eye injuries in any way and he can be an excellent and outstanding example of this principle himself—not forgetting, however, that there are a few very simple first-aid procedures, care-

fully selected, which may be of value, especially when agreed to by the attending plant physician or the eye specialist who is regularly engaged by the plant.

Essentials of Co-operative Effort

In 1929 it was my privilege to give an address on the general subject of "Co-operation in Industrial Health Work." Some of the statements made at that time with regard to participation of the physician and the safety engineer in this type of endeavor are still valid and may be referred to here.

The industrial physician is the professional technician in the field of industrial health endeavor. He must realize that special training and experience are necessary for the fulfillment of his proper function in industry. This implies not only a knowledge of checking up injury cases, but adequate studies of working conditions and medical procedures to the end that the prevention of injury and illness become a first principle. The doctor should be a party to all investigations, hearings, examinations, and proceedings which have to do with accidents and sickness.

The safety engineer is the lay technician among the personnel of industrial health workers. He should be informed upon the technical aspects of the control of various industrial accidents and health hazards and must keep himself informed of progress in this specialized field, because it is to him that the management comes for the solution of such engineering problems. The safety engineer must co-operate actively with the plant physician in working out methods of protection for the employees; usually the safety engineer is well trained in the engineering aspects of industrial hygiene, but he must not assume the prerogatives of a physician who concerns himself directly with the effects of various accident and health hazards upon the human body.

It is only through a smoothly functioning and co-operative relationship that the plant physician and the plant safety engineer can be of greatest value in their respective fields. Specifically, the physician and the safety engineer should meet at regular intervals, and analyze carefully the various factors responsible for the production of injury and deleterious effects to the eyes of the employees. The next step is the correction of conditions which bring

about the situations injurious to eyesight. Following this, an attempt should be made to ferret out all potential hazards, study them carefully, and correct them before an injury occurs. Merely stating these apparently obvious principles is simple enough in itself, but to get the proper results demands the constant vigilance of everyone connected with the plant.

One item of importance which may be easily overlooked is the instruction and constant reminding of employees by management, physician, and safety engineer. Too often in co-operative relationships the employee is forgotten. It is not appreciated how vital a part the employee plays in the prevention of injury and how, if properly handled, he may become the deciding factor in the control of accidental injuries.

Results to be Achieved

The possibilities for saving the eyes through the use of the suggestions made herewith will go as far as one's imagination may allow. Such results may be expressed in terms of eyes saved, which is the most important result, and in terms of money saved as well.

Quite likely there are many excellent examples, but two will be reported briefly: the Pullman Company, for instance, discovered that since they have had a special program of eye conservation, 122 eyes of workers and about $250,000 in compensation and medical expense were saved in six years. The Dominion Forge and Stamping Company of Canada learned that before an effective program was started, the cost of eye injuries averaged $1,668 per year; later this amount was reduced to $88 and subsequently to $10 per year.

Conclusions

Eye injuries constitute the most costly type of accidental injury in industry today.

The basis for the co-operation of the physician and the safety engineer in the prevention of eye injuries and the saving of sight should be a very definite realization on the part of both that special training and experience are essentials in the achievement of desired results. In working out co-operative relationships, a practical con-

sideration is the frequent interchange of ideas and experience. It is never necessary that the personality of either of these important individuals be submerged—their respective abilities should be complementary and their attitudes complimentary.

Perhaps it is an ideal consummation—but one has only to read the records of eye injuries and of the tremendous wastage and loss of sight to hope that in the future not only will the physician and the safety engineer, but all who have any relationship to industry, be fired by the same ambition and dominated by the same high purpose—the prevention of eye injuries and the saving of sight.

Arithmetic Ability of Sight-Saving Class Pupils in Cleveland, Ohio

Olive S. Peck

AS in reading achievement, sight-saving class pupils are on a par with normally seeing children in learning arithmetic processes, provided sufficient time is allowed for them to compensate for their visual handicaps

SINCE January, 1932,* the Stanford Achievement Test in Reading has been given annually to every sight-saving class pupil in Cleveland. This testing program has seemed to aid the teachers in measuring the effectiveness of their teaching methods and has helped the administrators in the proper grade placement of the pupils.

In view of the successful results attained through the use of the data afforded by the reading tests, it was decided to reproduce in large type the Stanford Achievement Tests in Arithmetic. Permission was generously granted by the publishers of the Stanford Achievement Tests to reproduce Form W of the Arithmetic Test for use in the sight-saving classes of Cleveland. The test is in two parts—Arithmetic Reasoning, and Computation.

The test was given in June, 1933, to pupils from 4B through 9A. It was repeated in June, 1934. All of the testing was done by the writer to secure uniformity in administering the tests. The achievement of individual pupils was graded by the teachers. Combined scores for each grade group were made by the writer. The median, or mid-score of all the individual scores arranged in order of size, was selected to indicate the standing of the class as a whole. For convenience in comparing the pupils' achievement in arithmetic with their intelligence quotients, arithmetic quotients were also

* See Sight-Saving Review, Vol. III, No. 2, June, 1933.

computed. The latter are derived by finding the percentage ratio of actual achievement of sight-saving class pupils to standard achievement of pupils in the regular classes (i. e., the class norm reported by the author of the tests).

One advantage of having individual scores made up by the teachers is that in checking the papers the teacher notes the parts of the test in which the pupil succeeds or fails. While these tests are only slightly diagnostic, they become more so for teachers doing individual work, as sight-saving class teachers do, if the teacher knows what each pupil does on the test.

Table I

Summary of Results in Arithmetic Reasoning and Computation Tests Given to Sight-Saving Class Pupils, Cleveland, Ohio, June, 1933*

Number pupils tested	Grade	Author's class norm (regular grades)	Median class standing of sight-saving class pupils			
			Arithmetic reasoning		Arithmetic computation	
			Regular time	Time and a half	Regular time	Time and a half
25	4B	4.4	5.4	5.6	4.7	4.7
15	4A	4.9	5.6	5.6	5.0	5.0
19	5B	5.4	5.3	5.3	5.4	5.4
23	5A	5.9	5.9	5.9	6.0	6.3
14	6B	6.4	7.4	7.4	8.0	8.0
13	6A	6.9	7.6	7.6	9.3	9.3
15	7B	7.4	7.8	7.8	8.3	9.2
13	7A	7.9	7.6	7.8	9.3	9.5
13	8B	8.4	8.3	8.3	8.8	8.8
12	8A	8.9	8.3	8.3	9.7	9.7
17	9B	9.4	8.6	9.0	9.9	10.2
10	9A	9.9	8.1	8.1	10.0	10.0

* Comparison of median achievement scores of pupils in sight-saving classes with scores of pupils in regular grades (author's class norms) for arithmetic reasoning and arithmetic computation tests, by grade—allowing regular time and time and a half.

The question of the amount of time to allow on the test came up just as it did in giving the reading tests. It was decided again to allow time and one-half. This was an arbitrary decision as the exact amount of time needed would depend on the individual eye

condition. The authors of the test allow enough time for pupils to work up to their mental level. It was thought that time and one-half would allow sufficient time so that the sight-saving class pupils could attain their mental level in spite of the loss of time involved because of vision defects.

Table II

SUMMARY OF SCORES IN ARITHMETIC TESTS—CLASS STANDING AND ARITHMETIC QUOTIENT—GIVEN TO SIGHT-SAVING CLASS PUPILS, CLEVELAND, OHIO, JUNE, 1933*

Number pupils tested	Grade	Author's class norm (regular grades)	Median score of sight-saving class pupils		
			Complete test—time and a half		Intelligence quotient
			Class standing	Arithmetic quotient	
25	4B	4.4	5.0	108	98
15	4A	4.9	5.0	101	99
19	5B	5.4	5.2	100	92
23	5A	5.9	5.8	101	94
14	6B	6.4	7.7	109	94
13	6A	6.9	8.3	105	99
15	7B	7.4	8.5	103	91
13	7A	7.9	8.3	100	91
13	8B	8.4	8.5	101	92
12	8A	8.9	9.2	109	95
17	9B	9.4	9.4	99	94
10	9A	9.9	8.9	94	94

* Comparison of median achievement scores of pupils in sight-saving classes with scores of pupils in regular grades (author's class norms) for combined reasoning and computation tests in arithmetic, by grade—allowing time and a half.

Comparison of arithmetic quotients of sight-saving class pupils with their intelligence quotients, by grade.

Tables I and II show the results of the 1933 test. A comparison (see Table I) of the median class standing for the extended time with the author's class standing shows that the median sight-saving class standing compares favorably, on the whole, with achievement of pupils in regular grades.

A comparison (see Table II) of the median I.Q. with the median arithmetic quotient shows that these pupils are working up to

their mental capacity. The intelligence quotients were arrived at by individual Binet Simon tests given by a clinical psychologist.

A comparison of the medians on the reasoning and computation tests shows that on the reasoning tests the pupils were limited by the level of their mental ability while the results on the computation tests indicate good teaching. In the primary grades pupils were limited on the computation tests because of certain processes and technique of arithmetic which they had not been taught.

Table III

SUMMARY OF RESULTS IN ARITHMETIC REASONING AND COMPUTATION TESTS GIVEN TO SIGHT-SAVING CLASS PUPILS, CLEVELAND, OHIO, JUNE, 1934*

Number pupils tested	Grade	Author's class norm (regular grades)	Median class standing of sight-saving class pupils	
			Arithmetic reasoning	Arithmetic computation
18	4B	4.4	4.9	4.5
20	4A	4.9	5.0	4.6
26	5B	5.4	5.7	5.8
16	5A	5.9	6.1	6.3
18	6B	6.4	6.4	6.3
22	6A	6.9	7.1	8.3
15	7B	7.4	8.4	9.0
17	7A	7.9	7.8	8.0
14	8B	8.4	8.9	8.9
14	8A	8.9	9.9	9.9
15	9B	9.4	8.7	9.9
11	9A	9.9	9.4	10.0

* Comparison of median achievement scores of pupils in sight-saving classes with scores of pupils in regular grades (author's class norms) for arithmetic reasoning and arithmetic computation tests, by grade—allowing time and a half.

While there seems to be little gain (Table I) in the median class standing in reasoning through giving time and one-half for the test, the gain is more apparent in the computation test. Evidently, sufficient time is allowed in the reasoning test for pupils to work up to the limit of their mentality. In the computation test the pupils show the results of good training in arithmetic technique and, through having extra time, were able to raise their standings.

On the basis of average class standing not much gain is shown in the medians but, from the standpoint of the individual pupil, the extended time makes quite a difference. A study of the individual results shows 42 pupils out of 189 gained from one month to two years and four months in class standing. The average gain for the 42 was 4.7 months. Since we are interested chiefly in the individual

Table IV

SUMMARY OF SCORES IN ARITHMETIC TESTS—CLASS STANDING AND ARITHMETIC QUOTIENT—GIVEN TO SIGHT-SAVING CLASS PUPILS, CLEVELAND, OHIO, JUNE, 1934*

Number pupils tested	Grade	Author's class norm (regular grades)	Median score of sight-saving class pupils		
			Complete test—time and a half		Intelligence quotient
			Class standing	Arithmetic quotient	
18	4B	4.4	4.7	110	95
20	4A	4.9	4.9	102	92
26	5B	5.4	5.6	102	93
16	5A	5.9	6.4	113	101
18	6B	6.4	6.3	102	92
22	6A	6.9	7.7	104	96
15	7B	7.4	8.9	115	97
17	7A	7.9	8.0	97	94
14	8B	8.4	8.9	106	92
14	8A	8.9	9.9	109	92
15	9B	9.4	9.3	107	95
11	9A	9.9	9.5	98	96

* Comparison of median achievement scores of pupils in sight-saving classes with scores of pupils in regular grades (author's class norms) for combined reasoning and computation tests in arithmetic, by grade—allowing time and a half.

Comparison of arithmetic quotients of sight-saving class pupils with their intelligence quotients, by grade.

pupil it seems reasonable to allow plenty of time. While some pupils may not need it, perhaps some few cases of extremely low vision should be allowed more than time and one-half.

It was decided, in view of these results, to repeat the tests in June, 1934, allowing time and one-half. This time the results were scored only for the extended time.

Chart 1

INTELLIGENCE TEST AND ARITHMETIC TEST—TIME AND A HALF—1933

Median arithmetic quotients of sight-saving class pupils, compared with their median intelligence quotients, by grade.

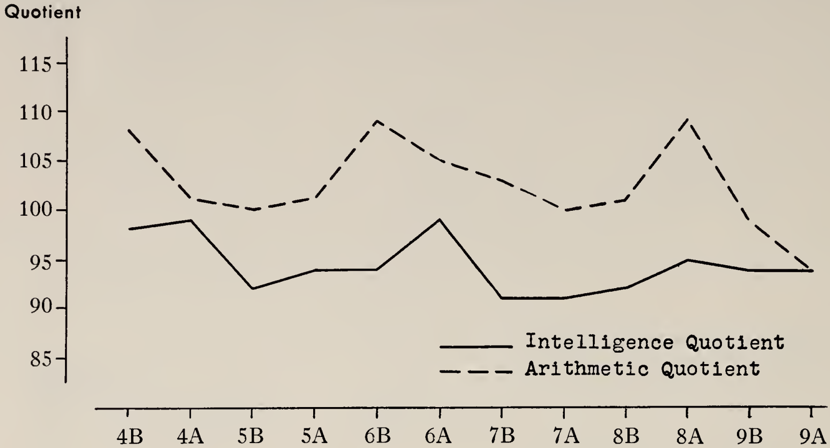


Chart 2

INTELLIGENCE TEST AND ARITHMETIC TEST—TIME AND A HALF—1934

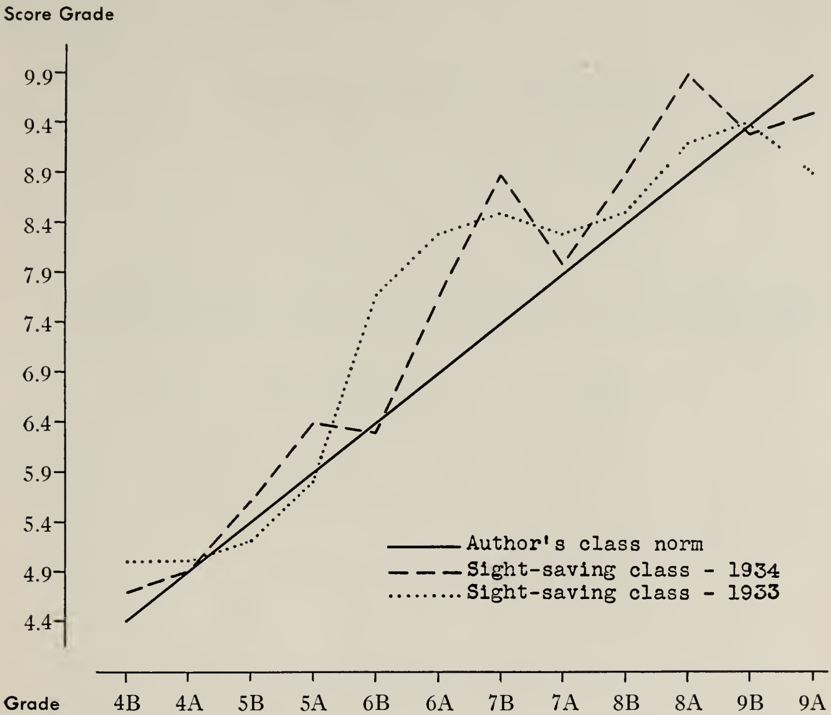
Median arithmetic quotients of sight-saving class pupils compared with their median intelligence quotients, by grade.

The results for 1934 indicate that the sight-saving median class standings compare favorably in most cases with the author's norms. (Table III.) A comparison of median arithmetic quotients with the median I.Q's. shows that these children succeed in arithmetic in terms of their mental ability. (Table IV.)

Chart 3

ARITHMETIC TEST—TIME AND A HALF—1933 AND 1934

Median arithmetic scores of sight-saving class pupils in 1933 and in 1934, compared with author's class norm, by grade.



The most interesting uses of the results of these tests were in teacher conferences. An individual record is kept of each child, with his mental age, arithmetic age, reading age, and dictation age, according to the Stanford Achievement Tests in those subjects. A conference was held with every teacher in which the achievement of each child in 1933 and 1934 was discussed. The child's mental age and his arithmetic age and the amount of growth in arithmetic for the year were considered and recommendations made in accordance with the findings.

In checking over the gain made by each pupil it was found that the average gain in arithmetic age per pupil from June, 1933, to June, 1934, was nine months.

The results of these tests seem to lead up to much the same conclusion as the reading tests—namely, that these pupils work up to the limit of their mental ability, when given enough time and when material is in a form which they can see, regardless of the eye defect. Doubtless, much of the difficulty which these children have in arithmetic in regular grades is caused by inaccuracy in copying from blackboards and the difficulty in reading small type material where difficulty in distinguishing small numerators and denominators in fractions and small signs adds to their forming faulty number concepts.

Perhaps, in closing, it would be well to add a word of caution in connection with this testing program. In checking up on achievement, we must not lose sight of the child's eye condition, and pressure should not be brought to bear by administrators upon either teacher or pupil to the extent that, in an effort to keep up his academic achievement, he is using his eyes too much.

However, through improved teaching techniques, it should be possible to save these children from inefficient learning. Our aim should be to reduce wasted eye effort through the study of effective teaching methods.

Editorial

July Fourth—A Celebration or a Tragedy?

Upon request, this poster is available in red, white and blue, size 22″ x 18″, for exhibit purposes

The Forum

THIS section is reserved for brief or informal papers, discussions, questions and answers, and occasional pertinent quotations from other publications. We offer to publish letters or excerpts of general interest, assuming no responsibility for the opinions expressed therein. Individual questions are turned over to consultants in the particular field. Every communication must contain the writer's name and address, but these are omitted on request

Your Child's Eyesight*

Naturally, all parents are interested in preserving good vision for their children. They know that a child with defective vision is handicapped from the beginning to the end of his life. They realize that good vision plays an important part in doing daily school tasks and may influence their future success and happiness.

Under our present educational system, during school years, the demand on eyesight in book work and blackboard work is continuous. In later life the demands made on good vision in industrial, mechanical and professional fields are tremendous and even in the pursuit of our pleasures the demand for good vision is insistent. For example, good vision is required to secure a license to operate an automobile or airplane, to play tennis or golf, and to enjoy the movies.

The State of New York, and other states as well, has recognized the tremendous importance to its future citizens of good vision. This State has shown its interest by placing on its statute books laws requiring the yearly testing of all school children's eyes so that any defects in vision may be discovered at an early age when most defects can be corrected and permanent loss of vision prevented. Parents are given a note of warning when defects of vision are found.

It has been assumed that parents would follow the advice contained in the warning note which states that they should consult with their family physician in regard to the properly trained specialist for the complete examination of the child's eyes, for treatment, and for the use

* Excerpt of radio talk given over Station WHAM, under the auspices of the Medical Society of Monroe County, New York.

of glasses when these are necessary. Attention is called to the fact that the school physician only advises of possible eye defects, and that co-operation on the part of parents is necessary in order to find out exactly what the real trouble is and how best to treat it. Co-operation consists in having the child's eyes properly examined by an eye physician of the parents' own choice and then in seeing that the advice is followed and glasses worn when ordered.

It is important for all parents to understand how good vision may be preserved and how defective vision may be corrected. There are three important conditions which materially aid in preserving good vision in school children. These are: good light, good print, and good health. The first two may be obtained at will and at little cost. Science and industry have provided us with very adequate light so that there is no excuse today to risk or ruin one's sight because of poor light. The best light is that which is sufficient to make the contrast between the black print and the space between the letters stand out clearly and sharply. The light should be without shadows, without glare, and without flicker. The proper amount of light is that obtained from a 60-watt frosted bulb placed 16 to 20 inches away from the printed page. A 100-watt lamp is required when the lamp bulb is 2½ to 3 feet away. All light should fall on the printed page and not directly into the eyes. This is accomplished by proper position and shading, the light being so placed that it falls from above or slightly behind and over the left shoulder. One sees by reflected light, that is, by that which comes from the printed page. Light which falls directly in the eye exhausts our retinal strength, causing eyestrain.

The second important condition for the preservation of good vision is good print. Fortunately much attention has been given to this subject during the past 25 years and today there is little or no criticism of the print in our textbooks. The print used in school books is good and properly adapted to the various grades in school, but many books read by school children out of school are badly printed. Parents must see to it that their children read well-printed books with fairly large type.

The third condition for maintaining good vision is first in importance and cannot be bought. This is good health. Good health refers to good general bodily health as well as to good eye health. And the one depends to a very large extent upon the other. With good general health, one nearly always starts out at least with good eyes, and poor health may mean poor sight. Therefore, in order to preserve good vision in normal eyes, it is most important to keep strong and well

and to correct all general health defects.

The eye is a marvelously delicate and a most complex organ, able to take twelve to fourteen perfect pictures every second and to send on the complete pictures for the brain to interpret. This requires precision and a perfectly working organism. In order to get good pictures, the eye, like the camera, must be in focus and, further, the transmitting apparatus must work efficiently.

If it is important to have good light, good print, and good health, in order to preserve good vision in normal eyes, it is even more important that these conditions should be met when the eye has some defect. Fortunately, about 80 per cent of school children in the lower grades have normal eyes, and only 20 per cent defective vision. These defects generally lie in a faulty focus which can usually be corrected by glasses, by treatment, or by correcting health defects. It can be easily understood that if the eye is out of focus because of its structure or shape or imperfect function, good or perfect pictures cannot be made on the retina. Blurred, distorted or imperfect pictures cause confusion, strain, and nervous upset. Therefore, it is of the utmost importance to make the eye focus the print or other images clearly and without too great effort. With an eye out of focus, good light, good print, and an otherwise healthy eye cannot produce good vision. The child with defective vision who is compelled daily to use his eyes not only undermines his health but risks further damaging his already defective eyes. Since glasses and proper treatment can correct most of these defects, corrections should be made before permanent damage is done.

The strain and pull on the eye in its efforts to overcome these defects commonly result in two harmful changes in the eye itself. First, the ocular muscles are often thrown out of balance; and second, the eye is stretched out of shape. In the first instance, the child becomes cross-eyed or wall-eyed, and when this condition remains too long, it often causes the vision in one eye to fail. A vicious cycle this—first, a continuous strain; second, a crossing or turning of the eyes, and then the partial or nearly complete loss of vision in the turned eye.

The second condition, the stretching out of shape of the eyeball, which very often takes place from the straining of defective eyes, is nearsightedness, a condition in which distant objects cannot be seen distinctly. In the stretching process, the eyeball becomes too long or deep and this may cause damage to the delicate structures within the eye, resulting in some permanent, incurable loss of vision. Under these conditions, there is again established a vicious cycle: first, a severe straining of ocular

structures, second, a stretching or giving away of ocular walls, third, nearsightedness, and finally some damage to delicate nerve tissue with partial loss of vision.

Both of these conditions, cross-eyes and nearsightedness, can, to a very large extent, be prevented; or if found and cared for early, they can be corrected. Only rarely are children born with cross-eyes and they are never born near-sighted. The early correction of these conditions will prevent serious complications or loss of vision.

In addition to the possible changes that eyestrain may cause in the eye itself, strain combined with poor vision has a bad mental effect. Generally children who can see the print of their books or the blackboard only imperfectly, or with much effort, soon get tired, lose their interest and get discouraged because they cannot get their lessons as quickly as their companions. They do not understand why. Sometimes they are thought to be stupid, or lazy, or indifferent, or all three combined. It is no wonder that sometimes they hate school and become backward or problem children.

In children, eyestrain is insidious; that is, children in the majority of cases do not have severe symptoms. They themselves, are not conscious of any eye trouble. Headache or eye fatigue is seldom complained of. Eyestrain may be discovered by a combination of some of the following symptoms or signs: red eyes, watery eyes, cross-eyes, squinting or scowling, awkward tilting or twisting of the head, holding the book close to the eyes, sensitiveness to light, nervousness, inattention, lack of concentration, subnormal sharpness of vision. This later sign is the best guide, but usually this requires testing, such as is given by the school nurse or physician. If all children could have their eyes thoroughly examined before six years of age, early eye defects would be discovered and many ocular complications prevented, provided the proper treatment were followed.

Parents may prevent eyestrain in their children by seeing to it that they use proper light and good print, and wear glasses, when recommended. If they follow the doctor's advice and do all they can to keep their children in good health, eyesight can be preserved, and most natural defects, often trivial at first, may be overcome and serious complications prevented.

A. C. Snell, M.D.
Rochester, N. Y.

Communication

Enforced Wearing of Goggles

Editors' Note.—Readers of the Review will be interested in this account of the difficulties which sometimes beset safety engineers in enforcing protective measures for employees. This letter was received by the National Society for the Prevention of Blindness; the name of the company is omitted by request.

Referring to your letter of the 19th inst., addressed to our Safety Director, beg to advise that the news item concerning the strike of our miners over the question of compulsory wearing of goggles was correct. There was a strike that lasted for three days, over the enforcement of the following clause in our agreement with the representatives of our employees:

"It shall be optional with the operator to require certain or all employees to provide themselves with and to use safety hats and/or safety shoes and/or safety goggles of an approved type. The men shall be *required* to wear goggles when using a pick, when breaking rock or slate, when chopping timber and in such other cases as shall be mutually agreed upon by the mine management and the mine committee."

The outcome was that the men returned to work and wore goggles as provided for in our agreement.

We were able to show that since 1929, when a campaign was started for the wearing of goggles, we have considerably reduced our eye accidents which, in 1926, totaled 396:

In 1930 we had 140 eye accidents
In 1931 we had 55 eye accidents
In 1932 we had 27 eye accidents
In 1933 we had 25 eye accidents
In 1934 we had 75 eye accidents

The increase in the 1934 figure is due entirely to the refusal of workmen to obey most safety rules and regulations in all lines of endeavor. We have not had a lost eye case since 1930, and we believe we have been justified in insisting upon our men wearing goggles for their own protection.

Note and Comment

Vision and Driving Safety.—"Is defective vision directly responsible for certain automobile accidents? Or is defective vision indirectly responsible for inefficient driving that leads to accidents?" asks Alvhh R. Lauer in the March issue of *National Safety News*. He has found, through experimental studies on the rôle of vision in automobile driving, that low visual acuity does not necessarily make an accident-prone driver, for the man who is aware of his condition drives more carefully to compensate for his defect. Low visual acuity in one eye, however, is a much greater hazard, since the poor eye may become functionally blind for some periods, and the field of vision thus limited. Persons having contracted visual fields, muscular imbalance, night blindness, or holes or spots in the vision represent definite examples of accident-prone drivers. Indirectly, however, visual defects exert a great influence upon the incidence of accidents, in that the person with a visual defect becomes more quickly fatigued and nervous, his judgment of distance is faulty, and glare presents a greater menace to him than to those with normal vision.

Save the Eyes in Childhood to Reduce Blindness.—"The chances of becoming blind are highest in the first two years of life," said Dr. M. Van Duyse, of Belgium, at the annual meeting of the International Association for Prevention of Blindness in London, in his talk on "International Classification of the Causes of Blindness." Ophthalmia neonatorum and corneal lesions are still responsible for the high proportion of blindness in the early years of life. His plea for accurate information on causes of blindness was backed up by Dr. A. Franceschetti of Switzerland, who felt that to prevent blindness from hereditary eye diseases, facilities should be made available everywhere for the sterilization of those who have hereditary eye diseases. Other measures to reduce blindness from hereditary causes included: premarital certificates of freedom from such diseases; the special training of physicians in genetics; the education of public health officials and the general public in this

subject; a decrease in consanguineous marriages; the collection of precise and complete statistics; and the increased use of social workers in this field.

Attending the meeting in London were representatives of nearly all the thirty-four countries affiliated with the International Association; because of the illness of Dr. de Lapersonne, president of the Association, the meeting was presided over by Dr. Park Lewis, of Buffalo, New York, vice-president of the International Association. The American National Society was represented further by Mr. Lewis H. Carris, managing director, and Mr. David Resnick, director of publicity.

Testing Visual Acuity.—A projection apparatus by means of which the optimum conditions for testing visual acuity may be applied is described by Drs. C. E. Ferree and G. Rand in the December issue of the *American Journal of Ophthalmology*. The instrument, an inexpensive projectoscope, may be equipped with the usual testing slides, or may have tests devised by the physician for the special diagnosis of the patients' acuity and color sense.

Eye Hazards in the Oil Industry.—In discussing health hazards in industry at the annual meeting of the American Public Health Association, Dr. R. A. Jewett stated: "For years, I have been impressed by the great amount of relief obtained from physical symptoms by proper treatment of the eyes." A survey of the vision of men employed in one oil company showed that 30 per cent had subnormal vision, and seven per cent had pathological eye conditions. A special eye hazard for filling station attendants is the irritation to the eyes of acids used in cleansing car springs and lubricating racks.

London Squint Clinic.—Twenty years in a London clinic for the treatment of squint has proved to A. Marian Thornett, ophthalmic surgeon, that squint is nearly always successfully corrected and vision in the squinting eye restored through orthoptic training, supplemented by other types of treatment, such as refraction and occlusion. Gaining the co-operation of the parents and the confidence and enthusiasm of the child are important steps in bringing treatment to a successful conclusion.

Prenatal Treatment, Visual Safeguard.—Among a group of mothers cared for at one hospital, 84 cases of gonorrhea were discovered and treated during pregnancy; none of the babies born to these women developed ophthalmia neonatorum, although gonorrheal ophthalmia did develop in the eyes of babies born to 15 women in whom there had been no evidence of gonorrhea and who had had, consequently, no prenatal treatment. In both groups of babies, the same precautionary drops of silver nitrate had been used at birth. The conclusion is reached by Drs. J. Bernard Bernstine and Mario A. Castallo, who report the records in the January 15 issue of the *Medical Record*, that treatment of the mother during pregnancy is important in the prevention of ophthalmia neonatorum. A further contribution to the prevention of ophthalmia neonatorum made by Dr. Castallo and Dr. P. Brooke Bland, and described by them in the March 23 issue of the *American Medical Journal*, is the eyelid retractor which facilitates the instillation of nitrate of silver in the eyes of the newly born infant. The instrument, which was first introduced in 1933, has been modified for greater security; its blades are so shaped that, when placed over the closed eyelids and gently separated, the eyeball, with the conjunctival sac, is exposed without the slightest trauma. Hence, free instillation of the antiseptic solution is assured.

Industrial Safety in Australia.—The right goggle for the special type of job is important in saving sight from industrial accidents, says a note in *Safety News*, official organ of the National Safety Council of Australia. Specifications are given for the proper protective devices and goggles for chipping, arc-welding and other eye-hazardous positions.

Muscle Balance, a Delicate Factor in Performance.—The fact that the mind can interpret only the impressions it receives, and that faultless sensation must precede accurate perception, has too frequently been overlooked in educational research, says Emmett Albert Betts in a recent issue of *Educational Research Bulletin*. While reading readiness is dependent to a large extent upon mental maturation, normal visual sensation and perception are also prime requisites. Mr. Betts declares that a certificate of visual readiness

to read should be required of all first grade children, and he describes a technique and apparatus for testing the oculomotor habits, faults of which, even more than of visual acuity, lie back of obscure inability to read after the stage of mental readiness has been reached.

Not only are perfect binocular vision and ocular muscle balance of particular importance in reading, but "it has now been proved beyond argument that lack of true ocular muscle balance is the most common cause of error in judgment in bringing an aircraft to the landing ground," says the third edition of the *Medical Examination for Fitness for Flying*, published by the British Air Ministry. Licenses for private pilots may now be obtained by those whose vision is less than 20/20, but correctible by glasses to that point; commercial pilots *must* have normal vision and perfect muscle balance.

Reduction of Hereditary Blindness.—The proportion of blindness caused by hereditary factors is still problematic; figures are quoted giving the percentage as all the way from a third of all blindness to less than five per cent. At a medical meeting in Freiburg, Germany, Prof. W. Wegner declared that persons who can trace their blindness to heredity make up some 20 to 25 per cent of the whole blind population. He recommends sterilization of such people, and goes farther in demanding that the sisters of men with Leber's disease also be sterilized, since the disease is frequently carried through the female to her male offspring. The intermarriage of high myopes, according to Prof. Wegner, should also be prohibited. To procure data for eugenic measures, he recommends an ophthalmological census of Germany's blind population.

Health Education in Rural Chinese Schools.—In developing a program of health education in rural schools in China, the Department of Public Health of the Chinese National Association of the Mass Education Movement made trachoma detection and treatment a first point of attack and a demonstration project. Seventy-five per cent of the 1,255 children examined in a rural school district were found to have trachoma; after a two-months' demon-

stration of the effectiveness of treatment, the improvement was so marked that teachers in whose hands the continuance of the treatment was placed needed no further prodding in keeping up treatment, and parents showed greater co-operation. The success of the trachoma campaign opened the way to a health education program to promote cleanliness in the school, in the individual, and in the home environment, and to promote the practice of health habits.

National Conference of Social Work.—Medical social eye workers will, as usual, hold their annual luncheon meeting during the National Conference of Social Work which takes place this year in Montreal; the meeting is called in co-operation with the American Association of Medical Social Workers and the National Society for the Prevention of Blindness. "Syphilis and the Eye" is the theme of this year's meeting, and special topics will include: "Eye Complications of Syphilis"; "What Can the Social Worker in a Syphilis Department Do to Prevent Loss of Sight?" and "An Eye Social Worker's Relation to the Syphilis Department."

During the National Conference of Social Work, provision will be made for consultation services, in the Sun Life Building. There, fifty or more national public and private agencies, of which the National Society for the Prevention of Blindness is one, will have attractive accommodations for displaying their publications and meeting their friends, answering questions and holding consultations, serving all who wish to get help on their problems. Mrs. Eleanor Brown Merrill, an associate director of the Society, will be its representative during the conference.

New Ophthalmological Society in China.—The Tsian Ophthalmological Society, organized in January, 1935, held its first meeting at Cheeloo University School of Medicine; Dr. Eugene Chan, formerly a member of the staff of the Wilmer Ophthalmological Institute, and now head of the Department of Ophthalmology at Cheeloo, presided at the meeting.

Sight-Saving Class in Paris.—Although the first attempt to open a sight-saving class in the Parisian school system did not meet with

success, determined effort on the part of the French Committee for the Prevention of Blindness has resulted in the formation of a class in Paris for children with seriously handicapped vision.

Is Trachoma Infectious?—Human trachoma is transmissible to monkeys, according to experiments carried out in the bacteriological laboratories of the Oscar Johnson Institute at Washington University School of Medicine, but the two clinical complications of human trachoma—cicatrization and degenerative changes in the cornea—are lacking in the infection arising in the experimental animals. The experimenters, Drs. L. A. Julianelle and R. W. Harrison, conclude that the evidence obtained in this study fails to confirm the opinion that the infection following inoculation of trachomatous tissue represents either human or simian folliculosis.

Dr. Wilder Honored.—The Leslie Dana Medal, awarded annually for outstanding achievements in the prevention of blindness and the conservation of vision, will be presented this year to Dr. William H. Wilder of Chicago. Dr. Wilder was selected for this honor by the National Society in co-operation with the St. Louis Society for the Blind. The medal, offered annually by a director of the St. Louis Society, is a prized mark of recognition of service for the conservation of vision. It bears the inscription: "Wise Clinician, Devoted Teacher and Humanitarian." Dr. Wilder is secretary-treasurer of the American Board for Ophthalmic Examinations; vice-president of the Illinois Society for the Prevention of Blindness; professor emeritus of ophthalmology at Rush Medical College, University of Chicago; and a past president of the American Academy of Ophthalmology and Otolaryngology.

Honor for Benefactor to Blind.—Because Robert E. Naumburg invented the Visagraph, a device for enabling the blind to read ordinary printed books without the aid of any other person, the Franklin Institute has awarded to him the John Price Wetherell medal for 1935. The medal is awarded annually for an apparatus original in its accomplishments, and of unquestioned benefit to humanity. The Visagraph automatically reproduces a magnified, raised copy of a printed page, which the blind can readily read with their fingers.

National Society Notes.—Staff members of the Society have utilized many opportunities to co-operate with allied organizations in conservation of vision. Mr. Lewis H. Carris, managing director, represented the United States and the Society at the annual meeting of the International Association for Prevention of Blindness in London; attended, with representatives of the Connecticut State Board of Education, in Hartford, the hearing on the bill applying for state aid for handicapped children; at the invitation of Bellevue Hospital, he talked to a group of internes and ophthalmological students on prevention of blindness; on a visit to Santa Fé, New Mexico, he addressed the annual meeting of the New Mexico Public Health Association which was held in conjunction with the annual meeting of the American Association for the Advancement of Science. Mr. Carris also participated in the panel discussion on the exceptional child held under the auspices of the United States Department of the Interior in Washington. He had the honor to present the Leslie Dana Medal to Dr. William H. Wilder at the St. Louis Society for the Blind's dinner in St. Louis. He was one of the speakers at the annual meeting of the Guild of Prescription Opticians in Rochester, New York.

Mrs. Winifred Hathaway, associate director, spoke on sight-saving classes, under the auspices of the City Board of Education, in Lexington, Kentucky; in Columbus, Ohio, she attended the Ohio Education Conference where she addressed the sight-saving class section. In co-operation with the Board of Education of Detroit, Michigan, Mrs. Hathaway participated in sight-saving week.

Mrs. Eleanor Brown Merrill, associate director, assisted in local prevention of blindness activities in Washington, D. C.; in Baltimore, where she spoke at the annual luncheon meeting of the Maryland Society for the Prevention of Blindness on "Sight Saving and the Community"; and in Pleasantville, New Jersey, where she talked on prevention of blindness in connection with National Negro Health Week. She will represent the Society during the National Conference of Social Work, in Montreal, early in June.

Continuing her demonstration and teaching work with the nursing profession, Miss Mary Emma Smith, R.N., director of nursing

activities, has visited nine cities in Iowa and South Dakota, where she held round-tables on prevention of blindness for public health nurses. She also attended the institute for nurses held by the Minnesota State Department of Health in Minneapolis.

Bringing eye health to the attention of educators has taken Dr. Anette M. Phelan to New Jersey State Teachers College in Trenton; to City Normal School in Syracuse, New York; to State Normal School in Cortland, New York; to the University of Chicago; to the National College of Education in Evanston, Illinois; to Indiana University in Indianapolis, to the University of Indiana, in Bloomington; to the Louisville Normal School in Louisville, Kentucky; and to Morehead State Teachers College in Morehead, Kentucky.

Mr. Louis Resnick, director of industrial relations, who has particularly interested himself in the prevention of accidents from fireworks and toy weapons, testified for the Maryland Society for the Prevention of Blindness in favor of legislative bills restricting the sale of air-rifles and fireworks.

Co-operating with the New York Tuberculosis and Health Association, staff members of the Society have talked over the radio on prevention of blindness topics. Mrs. Hathaway discussed "The Miracle of Seeing Eyes"; Miss C. Edith Kerby, statistician, described how "Foresight Saves Eyesight"; and Miss Isobel Janowich, editor, discussed "Eyes on Vacation."

Current Articles of Interest

Orthoptic Treatment of Concomitant Squint, Jacob B. Feldman, M.D., *Archives of Ophthalmology*, March, 1935, published monthly by the American Medical Association, Chicago, Ill. An account of the operation of an orthoptic training clinic gives some of the practical methods of bringing cases to a successful conclusion. The percentage of "cured" cases, while not conclusive because of the short time the clinic has been in operation, is encouraging. The author concludes: "Orthoptic treatment is not to be considered a cure-all or a rapid cure, but it has its place in ophthalmologic practice as a conservative, painstaking remedial measure, productive of successful results in a certain number of cases in which refraction and operation do not fully yield binocular vision with its ultimate result, stereopsis."

Ocular Dominance, L. F. McAndrews, M.D., *Archives of Ophthalmology*, March, 1935, published monthly by the American Medical Association, Chicago, Ill. Reviewing authoritative studies on eye dominance, the writer concludes: 1. The majority of human beings possess a dominant eye. 2. This eye is the right eye in more than 80 per cent of cases. 3. There is a direct relationship between the eye and the hand. 4. Practically all right-eyed persons are right-handed. 5. In testing with the Maddox rod for muscular imbalance, the rod should always be placed over the nondominant eye. 6. When prisms are prescribed, they should always be placed before the nondominant eye, if possible.

Ocular Complications of Gonorrhea, Charles M. Swab, M.D., *Journal of the Missouri State Medical Association*, January, 1935, published monthly by the Missouri State Medical Association, St. Louis, Mo. It is the duty of the attending physician to carry out prophylaxis for the eyes of the newborn, and to make daily inspection until both mother and child are discharged from his care, says the author, who recommends silver nitrate drops in the prophylaxis as the silver preparation of choice. He finds that even

where an ophthalmia does develop after the instillation of the drops, the disease is generally responsive to suitable treatment. He concludes that the best results in preventive measures are brought about through the intelligent co-operation of the physician, the attendants and the family.

The Management of a Case of Convergent Strabismus, Margaret Dobson, M.D., *American Journal of Ophthalmology*, March, 1935, published monthly by the Ophthalmic Publishing Company, St. Louis, Mo. The author gives a short account of the methods adopted in her private orthoptic training clinic and in the London County Council Eye Clinic, where she is in charge of the orthoptic training center.

Syphilis, the Most Costly of Communicable Diseases, W. Thurber Fales, Sc.D., and Ferdinand O. Reinhard, M.D., *Baltimore Health News*, February, 1935, published monthly by the Baltimore Health Department, Baltimore, Md. Although measles was epidemic in the city of Baltimore last year, a three-year comparison of the incidence of reported measles and reported syphilis shows that for 18,905 cases of measles, a high mark, there were 13,032 cases of syphilis. No other communicable disease could have such a high incidence without arousing the medical profession, the health department, the city authorities and the entire citizenry to action. Unlike measles, which is normally a brief and passing disease, syphilis accounts for 10 per cent of the deaths from heart disease, the leading cause of death, and 12 per cent of persons in institutions for the insane are there because of syphilis. The city of St. Louis spends between two and two and a half million dollars annually on the care and treatment of those having venereal diseases, says the report, and Baltimore undoubtedly spends a similar amount. A thoroughgoing public health campaign against this costly and destructive disease is urged.

Concerning the Recognition of Certain Symptoms and External Ocular Signs Referable to Various Diseases, Thomas B. Holloway, M.D., Published *Proceedings* of the International Medical Assembly, meeting at Philadelphia, November 5–9, 1934, reprint

published by the Joseph Schneider Foundation Fund, Dubuque, Iowa. A review of ocular symptoms discernible without ophthalmological instruments of precision: notably exophthalmos, ptosis, hemorrhage, tumors, pupillary signs, etc.

Recent Measurements of the Brightness of the Clear North Sky in Washington, D. C., James E. Ives and Fred L. Knowles, *Transactions of the Illuminating Engineering Society*, March, 1935, published monthly by the Illuminating Engineering Society, New York, N. Y. Presentation of results of some recent measurements of the brightness of the clear north sky in Washington, D. C., from 8 A. M. to 4 P. M., from May to November. Since the period from 8 A. M. to 4 P. M. covers, in general, the working day, and the months May to November during which the measurements were made are fairly representative of the whole year, it is believed that the information presented will be of value to the illuminating engineer and architect in the design of daylight illumination.

Glaucoma, Some Practical Considerations, Andrew J. Browning, M.D., *Northwest Medicine*, January, 1935, published monthly by Northwest Medical Publishing Association, Seattle, Wash. The author finds that the number of cases of chronic simple glaucoma that reach the ophthalmologist beyond the possibility of help by appropriate treatment is far too frequent, but the list could be materially lessened if the responsibility assumed by the family physician and refractionist were properly safeguarded by a diligent desire to see that such glaucoma-suspected subjects secure that ocular survey to which they are justly entitled.

Book Reviews

ATLAS FUNDUS OCULI. William Holland Wilmer, M.D. Introduction by Warfield T. Longcope, M.D. New York: The Macmillan Company, 1934. 100 color plates.

The year's, and perhaps the decade's, noteworthy contribution to ophthalmology is this *Atlas* of 100 full-sized illustrations of the ocular fundus, the production of which is the result of a lifetime of professional experience of one of the most renowned of ophthalmologists. He calls it "a modest volume" but it is exhaustive not only in pictorial expression but also in the descriptive text.

While some rare conditions are shown, the large majority consists of those which the ophthalmologist is likely to meet in daily practice, selected by Dr. Wilmer with the discretion and wisdom that comes of great experience. The histories are excellently epitomized, giving useful correlations of the pathologic lesions in the fundus with the general disease. The reviewer's main interest centers upon the accurate and brilliant reproduction of the pictures which has not hitherto been surpassed in any American or English publication, and which compares favorably with that in Celler's *Atlas* which was a very expensive publication and hence met with a comparatively small sale in America. While the illustrations are not directly the work of the author, he secured an artist who was competent with the ophthalmoscope in painting the appearances seen in the fundus. These reproductions of the fundus in color by brush were made by observation with the illuminating ophthalmoscope, the direct method being employed and the correctness verified by the Gullstrand binocular and Friedenwald ophthalmoscopes with the red light and red-free light.

A special lithographic process had to be evolved in order to bring out detail and the color values of the beautiful original paintings. Whereas, in the ordinary color work, four to six printings are made, in this *Atlas* the illustrations had to go through the press eight to sixteen times, a costly and laborious process; had it not been that part of the making of the plates was done prior to the rise in prices,

the subscription price would have been more than $35, for which it is now on sale.

This reviewer's opinion may perhaps be accepted as authoritative as he himself has worked for more than forty years in painting half a thousand or more ophthalmoscopic pictures which, owing to the great expense of reproduction, have not yet been brought forth in book form. "Art is long" but "time is fleeting," so perhaps in this lifetime another *Atlas* may not be published. Carlisle says, "Often I have found a portrait superior in real instruction to half a dozen biographies," and the Chinese maxim relates, "One picture imparts as much information as ten thousand words." So it is with this work; it will live for many years. It certainly will be found in all medical libraries and is well worth the price for the individual ophthalmologist.

Harry Vanderbilt Würdemann, M.D.

Ocular Dioptrics and Lenses. G. F. Alexander, M.D. Baltimore: William Wood and Company, 1934. 216 p.

The reviewer must admit that he was very much disappointed on opening this book to find that it was a peculiar conglomeration of the theoretical and practical, in which the practical plays a very minor part, and in which the theoretical is presented by means of a great number of formulae. To the reviewer's mind, there is inadequate explanation to go with these formulae, and he believes the average ophthalmologist will gain little through study of this work unless he be particularly well equipped in mathematical lore. Lest the reviewer do injustice in his criticism, he must point out, however, that the author reminds us in his prefatory note that this volume may be considered as supplementary to two others which he has written. Could one have all three works before him, it may be that their interrelation would make evident the more direct usefulness of the present work.

John N. Evans, M.D.

Contributors to This Issue

As chief worker in the Social Service Department of the Massachusetts Eye and Ear Infirmary, **Miss Amy G. Smith** has played a leading part in the development of medical social eye work. She supervises the training of medical social eye workers in this section of the country.

The authors of "Fenestration and Natural Lighting" are: **Alfred H. Fletcher,** director of the Bureau of Sanitation in Memphis, Tennessee; **Dr. Theodore F. Foster,** formerly superintendent of health in West Hartford, Connecticut; and **Daniel H. Goodnow, Jr.,** experimental engineer, West Medford, Massachusetts.

Dr. T. H. Farrell is a practising ophthalmologist in Utica, New York.

Senior physicist in the United States Public Health Service, **Dr. James E. Ives** has particularly interested himself in problems of lighting in industrial occupations.

Dr. C. O. Sappington is consultant in industrial medicine; he was formerly director of the division of industrial hygiene of the National Safety Council.

As supervisor of sight-saving classes in northern Ohio, **Miss Olive S. Peck** has been especially concerned with the educational problems of sight-saving class pupils.

Among our book reviews: **Dr. Harry Vanderbilt Würdemann,** himself the author of several textbooks on ophthalmology, is a well-known contributor of reviews to the Review; **Dr. John N. Evans,** another familiar contributor to these pages, is director of research at the Brooklyn Eye and Ear Hospital.

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Eye Health of Young Children

Anette M. Phelan, Ph.D. and Grace Langdon, Ph.D.

DURING the period of growth and development, the responsibilities of the teacher and the eye physician are of prime importance in sight conservation

RALPH is the young son of a professional woman. Shortly after he entered kindergarten, the teacher, in conference with his mother, reported that so far as she could tell by observation Ralph appeared to be using his right eye exclusively when looking at nearby objects. Subsequently an examination by an eye physician (ophthalmologist) revealed the fact that Ralph had but little vision in his left eye, and that the condition was not of recent origin, but probably had been present during the preceding year and a half which Ralph had spent in a nursery school. The examination also showed just how much correction the left eye needed to provide clearness of vision comparable to that in the right eye. When the correction was made by glasses, the cause for the exclusive use of one eye was removed. However, if the development of Ralph's visual powers was to proceed normally, the eye habits of the preceding months also needed correction.

In the first place, it was very important that Ralph's left eye be encouraged to attempt to see. Accordingly, the doctor (ophthalmologist) required the child to wear a patch over his good eye for several short periods each day. This treatment called into play the vision of the left eye that for so many months had remained unused. But that was not enough. Ralph's eyes did not work together; and it was most essential for the development of his powers of vision that his two eyes should gain in the ability to work together. Hence, for certain periods of the day, Ralph, wearing his new glasses, was encouraged to try to learn to use both eyes in his work and play.

Had Ralph's mother or the nursery school teachers detected that Ralph was using only one eye instead of both, a year and a half earlier, he would not have acquired eye habits that needed to be broken to insure the normal development of his eyesight.

Recognizing Visual Defects in Early Childhood

The first six years of a child's life coincide with a significant period of eye growth and with the development of important visual powers. If this development is to proceed normally, children must be unhampered by visual defects. These defects can be discovered by the alert teacher of the nursery school through her intelligent observation of children at work and at play. The earlier the child with defects is placed under the expert supervision of an eye physician, the better the chances for the correction of the defects. Such correction not only safeguards the child from subsequent visual difficulties hindering progress in later years, but makes possible for him, here and now, a life that is richer because he is freed from a defect that limits his activities.

Visual Difficulties of Young Children

The young child with vision normal for his age has an eye that is well adapted for seeing objects twenty feet or more away. Nevertheless, there may be found in groups of young children some with a range of vision so short that it is difficult for them to get a clear image of objects much less than twenty feet away. Children who are nearsighted do not see distant objects clearly. They should be placed under the observation of an eye physician (ophthalmologist) as early as possible.

There may be one or two children who, like Ralph, are able to get a much clearer image with one eye than with the other. Like Ralph, too, they choose to use the better eye with the result that the development of the unused eye is retarded. In time the eye with poorer vision tends to turn in, i.e., toward the nose, and the child is quickly recognized as a cross-eyed child. It is an easier matter to prevent such difficulties than to correct them. It is possible for a skilled eye physician (ophthalmologist) to correct cross-eyes. The earlier the child is placed under expert care, the greater the possibilities for a cure. For this reason any child with

cross-eyes, or any child showing a tendency to use one eye in preference to the use of both, should be placed as soon as possible under the care of an eye physician.

Cross-eyes are not the most serious outcome of the young child's use of one eye instead of both. While the eyes of the child between one and six years are gaining in the ability to work together, another power, dependent upon the teamwork of the eyes, is developing in the brain. That is the power to blend or fuse the images received by the two eyes. The fused image is not exactly like the image received by either eye in that the fused image has depth or distance just as have the blended pictures on a stereoscope.

Normally, the power of fusion should be well established in the brain by the sixth or seventh year. Throughout his development the child's perception of depth likewise develops. Sometimes a visual defect interferes with the effective teamwork of the child's eyes and retards the development of fusion.

Among a group of young children there may be a few who persistently receive blurred images of the objects at which they look, regardless of the distance of the object from them. Such difficulty usually is caused by an irregularity in the curve of the front of the eyeball (the cornea). The irregularity may cause a blur of the whole image or of some part of it. The effort made by the child to clarify the image results in a strain that is responsible for discomfort and subsequent "touchiness" which is frequently manifested in crying. Such children may be safeguarded from nervous strain and much unhappiness by the prompt discovery and correction of the difficulty by an eye physician.

Farsightedness is a normal phase of the early growth and development of the eye. Unless there are signs of strain or an evidence of cross-eyes in children of nursery school age, farsightedness is to be looked upon, not as a defect, but as a normal characteristic to be taken into consideration in planning the children's work or play activities. Contrary to popular notions, the farsighted person does not see distant objects better than one with normal vision; but he does see distant objects with greater ease than he sees those close up.

It must be remembered that the eyes of young children are still in a stage of growth and development during which close eye work

may cause discomfort. When permitted to follow their own inclinations, young children do a minimum of close eye work unless interests have been fostered which can be satisfied only in activities in which close eye work predominates.

Courtesy of the Cottage School, Riverdale, New York City

Good light and a large working surface for eye comfort

How May the Teacher Discover the Visual Difficulties of Young Children?

Whenever the question turns on the visual defects of young children, the teacher usually asks, "How can we tell whether children have visual defects when they are so young? These children do not even read." The answer is simple—watch the children at play.

Have you ever noticed that some children who like to throw balls or to roll them across the room, make no effort to catch a ball thrown to them from a distance? Have you observed also

when the group on the playground or on the roof is excitedly watching the progress of an airplane across the sky or of a boat on the river, that some child usually appears indifferent? It may be that he stands around looking rather puzzled by the fuss made by other children of his age over something which seems to hold no interest for him.

Have you watched this child in his play with toys such as foot-long trucks or engines? Does he keep his face close down to the toys or bring the toys up to his eyes? Does he tend to bump into things more often than do other children of his age? Does he appear confused when directed to some toy or object of interest across the room? Is it not possible that such behavior suggests that his range of vision may be limited? A persistent tendency of any one of these behaviors, especially when supported by the frequent repetition of one or more of the others, provides ample justification for a request that the child be given an eye examination.

Have you ever watched a child playing by himself with the wheels of a small wagon? Did he stop occasionally as if to brush away a fly from before his eyes? Have you observed him long enough to note that he repeats the gesture again and again when you are certain that no fly is bothering him? He may be attempting to brush away a blur that is repeatedly interfering with his vision. Have you noted the same child with a group of others hanging over a fence to watch a passing boat or train? Have you observed a tenseness in his body not apparent in the bodies of other children? Does he lean far over the fence with head thrust forward and face puckered in his effort to see clearly? Does the child also show a tendency to tilt his head to one side when looking at pictures? Is he likely to become tired quickly or to grow irritable over his play with toys? It is quite possible that he may have difficulty in getting clear images of the objects. A child showing such tendencies should be brought to the attention of an eye physician.

While you watched children at play with toys in the sand-box, or on the floor, have you discovered among them a child who persistently closes one eye when looking intently at the toy? Does he frequently appear to be using one eye when he looks at things? Have you ever tried holding some toy on the same side as the eye

which you think he is not using and then asking the question, "What is this?" Does he turn his head enough to bring the toy within the field of view of the other eye? It is by means of similar tests, and through close observation, that the teacher of young children may discover whether the child appears to be using one eye in preference to the use of both.

The alert teacher is in a strategic position to discover satisfactorily developing eye habits or to collect evidence which may indicate the need of an examination by an eye physician. Through a simple vision test by means of the Symbol E Chart,* which any teacher may learn to use, she may gather further evidence of low vision in one eye, which in itself may be responsible for a tendency toward the exclusive use of the other eye. She may also determine whether the child appears to have a limited range of vision. Usually the services of the school nurse are available for such tests. Sometimes she may prefer to make the test herself; frequently she may take the time to help the teacher learn the vision testing skills. Once the skills are learned, the teacher is in a position, when the need arises, to test informally the vision of any young child who she thinks may be nearsighted, or may have low vision in one eye. A detailed discussion of vision testing is to be found in *Conserving the Sight of School Children.*†

It is essential that the teacher of young children remember that valuable as are her observations and the supporting evidence found in the results of a vision test, an examination by a skilled eye physician (ophthalmologist) is the only real basis for judging the condition of a child's vision. However, until the time comes when such an examination is provided for all children, the observations of alert teachers are the most valuable means available for the early detection of visual difficulties of young children, and for getting children with such difficulties under the observation of an eye physician.

Teachers and parents frequently forget that the eyes of young children grow and change just as other parts of the body do. The

* The Symbol E Chart is published by the National Society for the Prevention of Blindness, Inc., and may be secured from their office, 50 West 50th St., New York, N. Y., for 25¢ plus 10¢ mailing charge.

† *Conserving the Sight of School Children*, Revised, 1935, is published by the National Society for the Prevention of Blindness, 35¢.

alert teacher can determine with a fair degree of accuracy when a child wearing glasses has outgrown the frames. She cannot detect, however, when the eyes of the same child have outgrown the lenses. This question is one for the skilled eye physician to answer —hence the need for periodic re-examination of the eyes of all young children wearing glasses. He is in the best position to judge the type of defect and the probable rate of change in the child's eye.

The teacher who maintains a file containing a complete up-to-date eye record for each child has at hand a readily available source of information. Such a record might well contain not only the results of the teacher's tests and observations, but also the information given by the physician and his recommendations for care or correction.*

With an increase in the number of teachers informed on the visual needs of young children, and with more teachers alert to significant behaviors of children at work or play, there will be fewer chances of overlooking a child who otherwise may be handicapped in his preschool years and may enter the first grade with a serious visual defect.

How Can the Teacher Safeguard the Vision of Young Children?

The teacher's responsibility for the eye health of children does not end with the discovery of visual defects, nor yet with the subsequent correction of the defects as the result of her efforts. Every young child needs supervision and care if the growth and development of his visual powers are to proceed normally.

With his muscular co-ordination still far from complete, and his judgments immature, the young child should be protected from accident hazards. The hooks for the child's wraps, while placed low enough for him to reach, independent of help, should be high enough so that no child need bump into them. The areas used for play should be free from projections in the fencing and from jutting corners. These areas, whether indoors or in the yard, should be well lighted so that the young child still unsteady on his

* A blank for an eye record may be found inside the back cover of *Conserving the Sight of School Children*. A copy may also be procured from the National Society for the Prevention of Blindness, 50 West 50th Street, New York, N. Y.

feet, and the older child dashing about with propulsive energy, may be safeguarded from accidents in dark corners.

The play material of children, too, should be selected with a view toward the reduction of accident hazards. Blocks with sharp corners should be avoided. Sharp-pointed knives, scissors, hooks and sticks have no place in the play equipment of young children. Neither have fireworks nor toy pistols. A safety censorship over the play activities of the young child may be used not only to safe-

Courtesy of the Cottage School, Riverdale, New York City

Safe outdoor play under adult supervision

guard him from eye accidents, but to guide him into the practice of safeguarding himself and others.

The eyes of young children are much more susceptible to infections than are the eyes of older children or adults. Furthermore, young children have not yet learned to protect themselves from the infections of others. Hence, it is important that any child with swollen, sticky or inflamed eyelids, or with inflamed or running eyes, should be immediately separated from the other children.

The practices established early in childhood of using only one's own handkerchief or, better still, a clean paper handkerchief and one's own washcloth and towel, and of washing the hands regularly after the use of the toilet, tend to reduce the incidence of eye infections among young children.

Sometimes when children return to a group after a prolonged or serious illness it may be apparent to the teacher that muscular energy is at a low ebb. Such children are usually protected from vigorous activities because of their very evident lack of strength. Usually the form that the protection takes is to give the child some quiet activity. Frequently the activity is looking at picture books. It is well to remember that the eyes of the child are as much a part of the body as are the muscles of legs and arms. Like these large body muscles, the child's eyes during convalescence need protection from fatigue. Certainly they should not be subjected to the strain of attempting to get clear images of nearby objects.

One of the problems for the nursery school and kindergarten teacher is that of safeguarding the child from glare. It is one thing to provide a well lighted place for children's play. It is quite another to protect children from facing a bright light. Any bright light within the field of view of the child tends, when he looks at it, to decrease for the time his ability to see; furthermore, it is likely to result in eye fatigue. The bright light may be sunshine streaming through the window which the child faces, or reflected from the wall or floor. It may be, also, that the bright window through which no sun is shining is a source of glare to a child sitting where the window itself is within his field of view.

Two buff-colored window shades of durable, woven, translucent material, on rollers fastened at the middle of the window, furnish a satisfactory means for the control of the light. Usually the very top of the window glass may be kept uncovered so that the light may be delivered better across the room.

In schoolrooms already equipped with shades that roll down from the top of the window it is still possible to protect children from streaks of sunshine and at the same time keep the upper part of the window uncovered. A tan or buff curtain of translucent material may be hung on cranes (swinging rods) attached to the window frame at the height which best serves to keep the direct

sunshine from striking the children themselves or surfaces which may reflect it into children's faces. The use of cranes makes it possible to swing the curtains off the glass when it is desirable that the level of illumination in the room be raised.

One resourceful young teacher, when faced by budget restrictions, solved the problem by the use of a pair of shades constructed from a good quality of brown wrapping paper. She tacked the new shades on old rollers and with a little help was able to meet the emergency satisfactorily.

Children's tables and chairs may be so placed that no child is forced to face a bright window and their activities supervised so that children have sufficient light on the one hand and, on the other, are safeguarded from facing a bright area. During the lunch period it is sometimes necessary that children sit at all four sides of the table. In a room with narrow windows separated by wide wall spaces it is sometimes possible to protect children by turning the table at an angle. It is well to remember, however, that such an arrangement, while removing the need for any one child to face the window directly, also tends to bring the window within the field of view of all children and is not desirable in a room with wide windows and narrow mullions. On days when the outdoor light is softened, and children have a chance to see a field or a grassy yard through the window, the table set at an angle has certain advantages. When the bright sunshine is falling on the window, it is better to leave vacant at the table the place facing the window.

Flexible groupings—with children free to come and go at will—serve to protect children from glare. When a provision is made for freedom of children to move about and for frequent change of groupings, no child is forced to sit long where he faces a bright light. With guidance, even a young child may be led to select a position in which it is unnecessary for him to face a bright light.

In the period of rapid growth and development the eyes of the young child are normally well fitted for outdoor vision and for looking at large objects at a distance of twenty feet or more. While the eyes have a remarkable power of adjustment and are able to see small nearby objects, close use of the eyes should not be required by the activities or materials of the nursery school or kindergarten.

The daily activities in childhood provide ample opportunity for practice in close vision.

Large, light-weight toys, easy of manipulation and suggestive of activity, are valuable play materials for small children from the standpoint of eye health as well as from that of the development of body muscles. Pictures—clear, of good size, and hung at the level of the child's eye—are desirable. Picture books for young children should be selected not only in the light of the size and clearness of the pictures, but also with a view toward giving children light-weight books that may be held easily with the page tilted up toward a vertical position.

The practice of teachers of holding up a book to show a picture to a group of children is open to question. The angle at which the picture is held, and the varying angles at which children in the group are often forced to view it, are not conducive to clear images and appreciation of the picture itself; furthermore, the practice makes for strain or fatigue for the child. The same criticism may apply to the practice of sitting at the piano playing to the group from an illustrated song book, and pointing out to the children small pictures on the page.

All equipment and procedures in schools for young children might well be scrutinized from the standpoint of their influence on the eye health of children. Attention might well be given to the equipment in the bathroom—the placement of hooks for the towels, the size of the hook as well as the size of the towel loop to be hung over it. Placing the hook slightly above eye level helps to prevent eye accidents. With the loop on the child's towel large enough to facilitate hanging the towel on the hook, the child is spared the effort of peering closely while he hangs it up. Then, too, large symbols and large name plates at eye level relieve the child of the need for close eye work in his search for the place for his things.

The habits of self help in children can hardly be justified if built at the cost of eyestrain. Certainly the practice of insisting that the young child lace his own shoes might reasonably be questioned when the child has to squint to see the eyelets in the shoe. For the sake of freedom from strain, the use of large buttons and large buttonholes in children's clothing is to be encouraged.

The approach of the holiday seasons, Christmas, Valentine's

Day and Easter, means in many schools for young children a period of gift making. If such gifts are to be made at all, the teacher, alert to the eye health of her children, will select for their activities gifts that call for a minimum of close eye work. She will also avoid the pressure that comes from making many gifts which hold the child to the type of task for which his eyes are not yet ready.

Finally, because of her relation to the child and the home, the teacher of young children is in a strategic position for guiding the parent into an understanding of the eye health needs of children. What applies to the child in the nursery school or kindergarten is true to a greater or less degree of the child in the home. From her vantage point of seeing many children, the teacher may not only observe the behavior of an individual child, but evaluate its significance in the light of what the rest of the children do. Her counsel may be most valuable to the mother who frequently observes only her own child.

In short, teacher and mother may well remember that the young child has growing eyes, and that one responsibility of adults charged with the care of the child is to furnish the best possible environment and guidance for the normal development of his visual powers.

Evidence Which May Help Teachers and Mothers to Discover Visual Difficulties Among Young Children*

Observable Behaviors

1. Attempts to brush away blur
2. Blinks continuously when at a task calling for close eye work
3. Cries frequently
4. Has frequent fits of temper
5. Pays no attention to favorite toys when they are across the room from him
6. Holds the book close to his eyes when examining it
7. Holds his body tense when looking at distant objects
8. Appears uninterested when other children are enjoying a circus parade or watching other distant moving objects

* Numbers and letters may serve as code symbols in recording behaviors or conditions related to eye health.

9. Seems bored during group discussion of some enjoyable things, such as an airplane in flight
10. Becomes irritable over tasks, even when self-selected
11. Selects small playthings and keeps his face close to them
12. Frowns and scowls when fitting parts of a toy together
13. Rubs his eyes frequently
14. Screws up his face when looking at nearby objects
15. Screws up his face when looking at distant objects
16. Shuts one eye or covers it when looking at nearby objects
17. Thrusts his head forward in an effort to see distant objects
18. Tilts his head when looking at nearby or small objects
19. Does not try to catch a ball thrown to him
20. Tends to be cross-eyed when he looks at nearby objects

Observable Conditions

a. Red rims on lids
b. Sties
c. Swollen eyelids
d. Watery eyes
e. Crusts on lids among lashes

Complaints of the Child

f. Dizziness
g. Headaches
h. Nausea

Trachoma Among American Indians

Sidney J. Tillim, M.D.

A PLEA for more effective trachoma service to the Indians of the Southwest, among whom trachoma is particularly prevalent

THE trachoma problem "is the biggest of all questions so far as the Indians are concerned," said Mr. H. J. Hagerman, commissioner to the Navajos, addressing the annual conference of the National Society for the Prevention of Blindness in 1926. "It would be almost useless to educate the Indians whose eyes are, through the prevalence of this disease, going bad." Fox, who had long and active experience with trachoma, is of the opinion that the disease is found in its most virulent and violent form among the Indians, particularly in the Southwest.[1] Other specialists who have visited this part of the country have been similarly impressed. The Indians live under extremely unfavorable conditions—their surroundings are overcrowded and unhygienic, and they themselves are in almost total ignorance of the infectious nature of the disease. This is nearly as true of those with schooling as of those who have never been to school.

Prevalence of Trachoma

We know that trachoma has been prevalent among the Indians of the United States for many years, although its historic background is obscure. Its incidence in the Indian country varies from 2 per cent in certain states to probably 20 per cent or even 30 per cent in some groups in other states. Among the tribes of the Southwest is found the highest incidence of the disease. There, the Navajos, numbering over 40,000, are the largest single tribe, and with the Apaches, Hopi, Zuni, and a number of smaller tribes grouped as the Northern and Southern Pueblos, make a total population of 78,000, or one-fourth of the Indians in the United

States. According to some very old Navajos, there were few cases of "sore eyes" among these people prior to the internment of the tribe at Fort Sumner about 1865—they had tuberculosis and epidemics of diarrhea, but no "sore eyes" in those days. Some groups, like the Taos, Zuni and Iseleta, even to this day are comparatively free of the disease. Yet trachoma has been prevalent among the Indians for a great many years.

Museum of the American Indian, Heye Foundation

Navajo man making moccasins

In 1910 the Government made the first special appropriation of $12,000 for trachoma work. These appropriations have been increased from year to year until now they run into many thousands. A dozen special physicians, each with a special nurse, are now employed in trachoma work. It is true that these special physicians have of late been giving part of their time "to include various surgical procedures, particularly those with reference to the eye, ear, nose and throat, as well as, in many instances, general surgery for other conditions."[2] This statement indicates an unhealthy optimism about the situation. Annually much needed trachoma work in the non-school population goes unattended.

All the years of effort on the part of the Government to eradicate

the disease have resulted in only modest improvement of the situation. Guthrie,[3] in 1926, gave the following checkered course of the incidence of trachoma: in 1910, of approximately 20,000 Indians examined by Indian Service physicians, 20 per cent had the disease. In 1912, 39,231 Indians were examined by United States Public Health Service physicians, and 22.7 per cent were found infected. In 1915, the Indian Office figures for 205,450 Indians show a 20 per cent incidence; and in 1920, from the same source, the incidence was shown to be 14.88 per cent. In 1925, of 38,111 Indians examined by special physicians engaged solely in diagnosis and treatment of trachoma, 19 per cent were infected; for the first half of 1926, of 15,722 examined by special physicians, 19.91 per cent were positive for trachoma. The report of the Commissioner of Indian Affairs for 1933 gives the following tabulation on incidence of trachoma among Indians throughout the United States:

Year	*No. Examined*	*Per Cent Infected*
1925	30,112	22.6
1926	26,362	24.8
1927	28,730	15.1
1928	37,524	18.0
1932	38,504	10.8
1933	61,426	9.9

A casual glance shows a steep decline in the incidence of the disease, and might by inference be applied to conditions in the Southwest. This would be a mistaken impression. The figures above are gathered from the whole Indian population located in twenty-three states. They do not indicate the number of examinations done in the different sections where the incidence varies from less than 4 per cent in Oklahoma, which has 29.6 per cent of the total Indian population, to around 25 to 30 per cent incidence in the Southwest. It must be assumed that the situation has improved considerably since 1910, but from all indications the incidence in Arizona and New Mexico is still appallingly high.

For the Southwest, in 1926, of 6,859 Indians examined, 21.72 per cent were trachomatous, while in 1925 the Indian Office gave the amount as about 16.14 per cent.[4] In 1928 Guthrie[5] states that among the Indians of Arizona and New Mexico some of the tribes

show 40 to 50 per cent incidence. Hancock[6] wrote in 1933 that in the Apache school at San Carlos, of 250 pupils, 40 per cent of them had trachoma and 8 per cent more were suspected of having the disease. In the spring of the same year, at two boarding schools in the Navajo country, of a total of 493 pupils, 203, or 40 per cent, were diagnosed as trachomatous and 6 per cent additional were suspected cases. It must be mentioned that too much reliance should not be placed on the figures given because findings vary with examiners and because they do not indicate whether the examinations were done on school children or adults, or both. It may be taken as a rule, in considering the figures, that wherever the examinations were by special physicians, they were almost exclusively on school children. The season of the year also influences the figures: in reservation boarding schools there are usually more positive cases in the spring.

Reliable data for incidence of trachoma among the adult Indians are not available. The writer's experience, however, gives an inkling of what this might be. In July, 1933, of 763 male Navajos examined for employment with the C.C.C. organization, 204, or 26.8 per cent, had trachoma, and 28 others, classed as having conjunctivitis, were probably trachomatous. The number of examinations is too small for any general conclusion, but it does point to what might be expected in a survey of the adult population. Unfortunately, such an undertaking at this time would not yield any dependable findings; the population is too scattered and unprepared to give worthwhile co-operation. A trachoma census was attempted in 1927, using portable clinics manned by specialists and specially trained nurses; it was soon given up as a bad job.

Morbidity of Trachoma

The scope of the problem and its appalling ravages upon the population have often been mentioned without attempt at a factual estimate. If we estimate by comparison with reliable findings in other fields, we should obtain a conservative view of the situation in this section of the country. The extent of morbidity from trachoma may be indicated by the number of cases with distorted eyelids, loss of vision, or both. Rice, Smith, and Sory[7] found in Missouri, Arkansas, Kentucky and Tenessee that out of 10,317

cases, 22.5 per cent resulted in entropions and 5.66 per cent in blind eyes. Rice and Smith[8] found 12.5 per cent of nearly 4,000 cases seen by them in Missouri had 20/200 vision or worse in both eyes, and "of 1,154 complete records studied, 88 per cent showed the presence of pannus involvement of the cornea." From these figures we can estimate that among approximately 16,000 cases of trachoma in Arizona and New Mexico, 3,600 Indians require operative correction of their lids; about 900 are totally blind; 2,000 have 20/200 vision or less in both eyes; and over 12,000 have some degree of pannus involvement of the cornea.

It is not the object of this paper to paint a special picture, but to clarify a state of affairs deserving special attention from those who may have the power to produce the remedy. Hagerman,[9] as the representative of the Government, speaking on this subject, said: "Health and sanitation should be the first concern of the Government as far as the Indians are concerned, and it seems to me that industry and manual training should be second, and general education the third." The Indian Service has been coping with the problem for over a quarter of a century. Appropriations for conservation of health among the Indians have grown from $40,000 in 1910 to $1,440,000 in 1929; $2,993,600 in 1930; $4,227,500 in 1932; and $3,213,000 in 1933. During this period more than a dozen trachoma specialists have been added to the service, and the number of general physicians and nurses has been multiplied several times over. When we consider the results obtained by the United States Public Health Service in its war on trachoma in Knott County, Kentucky,[10] for instance, where "one of the worst infected trachoma regions in the country has been practically cleared of the disease within a period of less than ten years," we sense a fatal weakness in the attack on the problem among the Indians. It is the opinion of the writer that the Indians pay the highest price for medical services of any group of people in the United States receiving a like service. It is true that part of the money from health funds is expended in educating the Indian to the idea of accepting medical services. In 1924, in desperation over the problem, or perhaps it was merely "stimulating naïveté" as Fox called it, Commissioner Burke ordered all Indian Service physicians to learn how to treat trachoma or get out of the service

—with disastrous results to the Indians. In 1927 the Department introduced the plan of "trachoma" and "trachoma-free" schools; by 1932 the plan proved itself impractical. During the same period a very expensive adventure with portable clinics, with movable, expensive paraphernalia and specialists, also ended in failure.

Nature of Trachoma

To understand better the nature of the problem, it is well to mention briefly some characteristics of the disease. Trachoma is

Museum of the American Indian, Heye Foundation

Navajo woman at loom

a granular condition of the palpebral conjunctiva usually associated with pannus of the cornea, severe congestion of the whole conjunctiva, a mucoid or mucopurulent discharge, and severe subjective symptoms of pain, photophobia, and impaired vision, depending upon the stage of the disease. The chief loss through the disease is destruction of vision and the disablement from distorted lids. As to its etiology, many theories have been advanced. Among these we have the "inclusion bodies" of Prowazek, the "free initial bodies" of Linder, the deficiency theory of Stucky and others, and the *Bacterium granulosis* of Noguchi.[11] The last named

is now generally accepted as the likely causative agent. This view is well supported by the experimental and clinical work of Olitsky[12] and his co-workers; by Noguchi's own memorable experiments in the Southwest; by Proctor and Richards[13] in their inoculation of human subjects; and by a large number of foreign investigators. The disease, often violent in its manifestations, is only mildly contagious; reasonably moderate precautions are usually sufficient, except for a highly susceptible person. Filth, overcrowded living conditions, disregard for proper management of infectious cases, and exposure to chemical irritants of smoke and to the elements are the contributing factors to the perpetuation of the disease. To diagnose a case of trachoma is not always a simple matter; frequently repeated examination by an expert is required to establish the diagnosis. The treatment, in view of the possible sequelae, should be in the hands, or under the supervision, of specially trained physicians. This view is recognized wherever organized trachoma work is in progress.

Present Methods of Trachoma Control

Under the present system of operation in the Indian Service the trachoma work is dependent upon a dozen specialists, three of whom are in the Southwest. Their duties are chiefly to examine school children about once in three to four months and operate on those requiring surgical procedures at the time. These men also give their time to other surgical work while visiting the Agency or school hospitals. The after-care—meaning after the specialist moves to another location and until his next visit—is usually left with a nurse under specific instructions.

The diagnosis and treatment of trachoma in the non-school population are left to the willingness and inclination of the school or Agency physician. Unless this general practitioner has this willingness and inclination—and often he has other leanings—this part of the population is left untreated. Even if the physician has the desirable attributes, he must gain his knowledge of the disease without systematic or authentic instruction from any one and at painful expense to his Indian patients. It is known that men who evinced a sustained interest in this work were refused the privilege of taking postgraduate instruction in diseases of the eyes, even

after two years of Agency work. Some standard provision for encouragement and assistance for such physicians should be provided.

There is another weakness in the present attack upon the trachoma problem. It is the failure to use the hundreds of hospitals connected with the schools and agencies to their full potentialities as educational and clinical centers. Treatment of trachoma does not usually require a long hospitalization and present facilities are sufficient for a large turnover; a systematic educational campaign to continue until the last case of trachoma has been treated is necessary to keep the Indian coming for treatment. Regularly, every year, the Commissioner of Indian Affairs is asked to plead for more funds for conservation of health among the Indians. There is no denying that many of the present hospitals are handicapped by insufficiency of proper facilities for successful operation. It is likewise true that many Agency and field physicians are laboring to capacity. But so far as trachoma is concerned, neither the hospitals nor the physicians are delivering their full potential value. If, too, the exorbitant costs of bringing cathartics, cough syrup, and aspirin to the Indians were eliminated, the saving would help to increase the effectiveness of the attack upon trachoma in the non-school population.

Another great weakness in the present method of dealing with the problem is the lack of sound co-operation between the Agency offices, school authorities, the Extension heads, and the medical branches of the Indian Service. A tour of most of the Agencies in Arizona and New Mexico in 1933 disclosed the fact that the medical personnel is seldom called upon to assist in enlightening the Indians on health and sanitation. In only two schools did the physicians actually give one or more talks to adults, or even to school children. The Extension heads who direct the Indians through their chapter organizations seldom encourage such talks, except to fill their program when they run short on their own brand of speechmaking. Yet, all through the world where trachoma has been systematically attacked, the greatest importance is attached to the education of the populace concerning the disease. This view needs little argument for support. Wherever trachoma is prevalent

the homes of the people have been its flourishing ground; in the Indian country we may add the Reservation boarding schools.

Suggestions for Improved Control

It is the opinion of experienced men in the United States Public Health Service such as McMullen, Bailey, Mossman, and others, and men who have coped with the disease in other countries, that trachoma can be eradicated, and that it is fostered by ignorance and unhygienic living conditions. Jitta[14] says: "Trachoma is, above all, a family disease. Children are infected at an early age by either the parents or older children." Bailey[15] says: "A systematic campaign of education should be instituted by means of illustrated talks to school children and at public gatherings of adults . . . setting forth the dangers of and the means of preventing trachoma." McMullen,[10] a pioneer and an outstanding authority on trachoma campaigns, in his account of a survey in eastern Kentucky writes: "In making the investigation every opportunity was taken advantage of for making talks in the schools, churches, etc., relative to the communicability of trachoma and the danger to the eyes."

The writer suggests that all physicians at present in the Indian Service and all who may join the Service in the future either have some practical experience in handling trachoma or be given an opportunity for training under competent men. No better clinical material can be had than in the major Indian hospitals, and the Indian Service has now a number of highly competent men of many years experience who could instruct the Agency and school physicians. The personal preferences of physicians for certain special branches of medical practice is well known. Not a few of the men encountered in the Indian Service have expressed themselves as being without interest in the problem because they "don't care for eye work." These men, unless they qualify as experts in another branch of particular interest to the Indians, such as tuberculosis, or pediatrics, or obstetrics, deprive the Indians of a service they have a right to expect and which should be protected. For some reason, many Agency physicians remain indifferent to the challenge of the trachoma problem. Perhaps it would be practical to consider a plan similar to the one in Turkey for making available training

for men in trachoma work. In substance, physicians engaged by their government for trachoma work are given special instruction at the government's expense. During the period of training, these men are paid their regular salary, but this is refunded to the government if a man, by reason of unsatisfactory scholarship, resignation, or dismissal, later fails to serve for one year. It may be pointed out in the United States that, in the Southwest, physicians could be trained at Indian Service hospitals without loss of time because many of these hospitals can profitably use added personnel.

Summary and Conclusion

The present status of the trachoma problem among the Indians has been presented. The situation in the Southwest has been stressed because there the incidence is the highest, and for the personal reason that the writer has more intimate knowledge of conditions in that part of the country. The suggestions in the course of the paper indicate the means for a more effective attack, with little if any added cost, upon the disease which has plagued the Indians for so many years.

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Activities of State Commissions for the Blind in the Field of Prevention of Blindness*

Lewis H. Carris

AN exposition of the responsibilities and possibilities of state commissions in preventing loss of sight

IT seems logical at this time to discuss the work of commissions for the blind in the field of prevention of blindness and their relationship to state official and voluntary agencies interested in sight conservation, as well as to the National Society for the Prevention of Blindness. Questions have arisen of relationships between the National Society and commissions for the blind, and it may be advisable to state briefly some of the functions and limitations of each agency.

The activities of the National Society are based upon Article I, Section 2, of its by-laws, as follows:

"The objects of the Society are:

"1. To endeavor to ascertain, through study and investigation, any causes, whether direct or indirect, which may result in blindness or impaired vision.

"2. To advocate measures which shall lead to the elimination of such causes.

"3. To disseminate knowledge concerning all matters pertaining to the care and use of the eyes."

In carrying out these objects, the Society co-operates with all agencies of society, official and voluntary, which have either a direct or an indirect interest in the prevention of blindness or the

* Presented before American Association of Workers for the Blind, Louisville, Kentucky, June 27, 1935.

conservation of vision. The fact should be emphasized that the Society is a voluntary organization having no jurisdiction over any state or local agency, as is the case with the National Tuberculosis Association, the Red Cross, etc. Although there exists between the National Society for the Prevention of Blindness and the active state voluntary organizations for the prevention of blindness in Illinois, Maryland and Louisiana a close co-operative agreement, there is no charter relationship. This limits the National Society to suggesting ways in which blindness may be prevented and vision conserved.

Among the official national agencies with which the Society co-operates actively are: The United States Public Health Service; the Office of Education and the Office of Indian Affairs, United States Department of the Interior; and the Children's Bureau, United States Department of Labor. In time, it is hoped that many of the functions now performed by the National Society will be taken over by the Federal Government, as, for example, the promotion of sight-saving classes, the training of special teachers, and the preparation of publications for their use.

As a member of the National Health Council, the Society has a working relationship with practically every voluntary national health agency. As a member of the National Social Work Council, it has close contact with many national social agencies. Certain parts of the Society's program are developed in co-operation with the medical profession, i. e., the American Medical Association, especially the Section on Ophthalmology, the American Ophthalmological Society, and the American Academy of Ophthalmology and Otolaryngology. The Society has a co-operative relationship also with the National Education Association. One of the joint undertakings has been the preparation and distribution of the bulletin, "Conserving the Sight of School Children," a publication of the Joint Committee on Health Problems in Education of the National Education Association and the American Medical Association, in co-operation with the National Society.

Since, in any state, the activities of a well-rounded prevention of blindness program are not confined to one department or board, but are shared by many, the National Society must actively co-operate with state boards of health, state boards of education,

and state departments of labor, as well as with state commissions for the blind having departments for the prevention of blindness. The state department of education, or the state department of health, according to the state regulations, is responsible for the eye examination of school children as a part of its medical inspection activities. The state department of education is concerned with classroom environment, teaching methods, and health education; and it should, of course, have full authority in the promotion and organization of sight-saving classes. In most states, commissions are of great help in recruiting pupils for sight-saving classes.

State departments of health are responsible for preventing ophthalmia neonatorum, trachoma, and other communicable diseases. They should have a great interest in the elimination of venereal diseases, which are responsible for so much blindness and partial loss of sight. They should be increasingly active in the promotion and establishment of prenatal clinics, which are so instrumental in saving sight.

In most states, the state industrial board, or the agency performing the functions of such a board, is vitally concerned in the prevention of accidents and in the elimination of industrial disease, both of which cause a large amount of visual impairment.

Although only a relatively small number of states have prevention of blindness departments which may be called, in any sense, aggressive agencies, during the past several years there has been a remarkable development in the preventive activities of certain commissions for the blind, for example, Massachusetts, New York, New Jersey, Pennsylvania, Ohio, Missouri,* Virginia. In Louisiana, the legislature makes an appropriation to the State Commission which, in turn, is budgeted by the Commission to the Louisiana Society for the Prevention of Blindness for the purpose of carrying on an intensive campaign of sight conservation. To be sure, every active commission for the blind does some preventive work, although few other than those named have a well-defined program and staff members whose principal responsibility is in this field.

There has been a trend toward the transfer of control of state commissions for the blind to some other state department, al-

* It is a matter of interest that the Missouri legislature has appropriated $50,000 for prevention of blindness work, to be expended by the Commission in the next biennium.

though the name, "commission," is retained in most cases. In the seven states having commissions with active departments for prevention, none is a separate entity: in Massachusetts it is a part of the State Department of Education; in New York, while appointed commissioners are retained, it is a division of the Department of Social Welfare; in New Jersey it functions under a similar department, as is the case in Pennsylvania; and in Missouri it is under the State Board of Control of Eleemosynary Institutions. All state commissions for the blind are official agencies created by law, with duties defined by law. Public funds for their operation are appropriated by successive legislatures; the appropriations vary in different states and in different years.

Too much cannot be said in praise of the prevention of blindness activities of commissions for the blind. In every state where such a department exists, however, there are many obvious needs and some limitations. It may be well to point out some of the essentials in an expanding program of a commission.

It would seem essential that a commission for the blind establish, by specific legislative enactment, a separate department for the prevention of blindness having a definite budget which is adequate to maintain a well-trained personnel. The very necessary work of caring for the blind is so immediate and so important that, frequently, commissions which do not have separate departments have neither the time nor the resources to do effective preventive work.

While a state commission for the blind cannot take full responsibility in all activities related to prevention of blindness, it should act as a source of information on sight conservation for other state agencies, and should, within the limitations of law, serve as a propaganda agency by issuing pamphlets, by providing speakers for public meetings, and by holding public meetings from time to time, particularly the type of meetings called "eye institutes," which have been held in several states.

The commission should also take the lead in calling conferences of representatives of various state agencies having a responsibility for conservation of vision, at which the work of each might be discussed and plans made for closer co-ordination. Whenever possible, it should prepare for distribution a pamphlet setting forth

the various responsibilities of each agency for the conservation of vision, the co-operative relationships established, and the resources available within the state.

There are two distinct aspects of any prevention of blindness and conservation of vision program: (1) keeping well eyes well, and (2) curing sick eyes. Keeping well eyes well is a part of an intricate social program which should be the concern of all agencies dealing with the physical well-being of mankind. It enters such diverse fields as the maintenance of a well-balanced diet; the proper illumination of home, school, shop, store and office; the prevention and cure of venereal diseases; programs for eugenics, etc. Curing sick eyes should be a primary concern of the state; here, the tendency is to centralize control in a single state agency. As the general standards of health and living are improved, there will be a diminishing number of sick eyes to cure.

One of the principal prevention of blindness activities in any state is the campaign against ophthalmia neonatorum. Naturally, the two agencies primarily concerned are the state department of health and the state commission for the blind. State legislation should define the responsibilities of each.

Since the function of a state board of health is the prevention of disease rather than its cure, it would seem that it should be given only the responsibility for preventive measures. These logically include: the requirement that all newborn babies receive approved eye prophylaxis; the free distribution of an approved prophylactic; the requirement of prompt reporting of cases of ophthalmia neonatorum; and authority for the strict enforcement of these regulations. All responsibility for the treatment of ophthalmia neonatorum might be centered in the prevention of blindness department of the state commission for the blind. Under such an arrangement the department of prevention of the commission should have funds to be used for immediate treatment and care, as well as an adequate nursing staff for emergency calls. In addition, provision should be made for notifying the department by telegraph or telephone should difficulties arise in obtaining immediate local hospitalization. All local authorities should be impressed with the emergent nature of ophthalmia neonatorum—it should be stressed that a delay may result in blindness. It should

not be difficult to obtain adequate funds for the treatment of ophthalmia neonatorum if it is understood that the special funds will be devoted exclusively to this purpose.

A splendid example of an aggressive campaign against ophthalmia neonatorum is that of New York State, where a working agreement has been developed by the Department for Prevention of the Division for the Blind and the State Department of Health. Copies of this agreement have been distributed to you; additional copies may be procured by addressing the Division for the Blind, New York State Department of Social Welfare, 80 Centre Street, New York City.

Perhaps the most important activity of the prevention of blindness department is case work to save or restore vision. In this department is centered ultimate responsibility for seeing that a resident of the state who is threatened with blindness shall obtain prompt, competent medical, surgical, hospital and social service. Hundreds of persons now living in the world of the sighted would be blind but for the services of state commissions. Theoretically, in every state there are eye physicians and hospitals that offer the necessary medical and surgical skill to any citizen; yet we all realize the need for a particular agency that has full knowledge of all the resources available to prevent blindness.

The commission should seek legislation authorizing it to provide medical and operative treatment for needy individuals. An emergency fund should be established to be drawn upon by the commission for the reasonable remuneration of eye physicians and for all other necessary professional assistance. With this arrangement, no time would be lost in providing the required treatment while responsibility for its payment was being determined. It is, of course, assumed that local communities would be obligated to pay in whole or in part for the treatment of their own residents and that, whenever possible, the state emergency fund would be reimbursed by the municipalities.

The question of whether all control should be centralized in the commission depends, in a large measure, upon the traditions and practices in each state. In general, however, it would seem that local communities should assume their share of responsibility, and a main objective of the commission should be to make local com-

munities aware of their obligations, especially those that are imposed by law.

The importance of preventive effort is taking its place along with the fully recognized state responsibility of caring for the victims of blindness. There should be no conflict between the two, provided that separate appropriations are made by legislatures. As time goes on, it is probable that the work of commissions for the blind in caring for the blind will be decreased, and that preventive work will be correspondingly increased.

State commissions should welcome the services of voluntary agencies for the prevention of blindness in their own states. A state council for the prevention of blindness, composed of representatives of the various responsible agencies of society, would be of great help in efforts to obtain necessary legislation and funds.

From the very nature of its work, the National Society should be of every possible assistance to prevention of blindness departments of state commissions. It is apparent that the work of the National Society and that of the prevention of blindness departments complement each other. The field is a large one and there is much to be done.

There is a feeling that national organizations contemplating activities in a state where there is a commission or department engaged in work for the blind or prevention of blindness should consult the state agency in advance regarding the service to be extended, and, further, that in case of differences in point of view between national and state bodies the local program should be respected. The National Society has never consciously failed to respect state programs. Differences of opinion may have arisen through the application of the Society's policy of dealing directly with any official or voluntary state agency requesting assistance, or may have been caused by the fact that the recommendations of the Society must be general in order to make them widely applicable. It must be apparent that the subordination of the National Society implied in the idea of advance consultation and modifications to meet the wishes of state groups would be impossible. The national program has been developed through study and experience, but it should perhaps be emphasized here that it is not the intention of the Society to impose its suggestions on local groups.

The time has come to work harder for the establishment of official state agencies for the prevention of blindness. Probably, in most instances, they will be departments of state commissions. Publicity given to the excellent work already done may help to establish more active preventive work in the other states.

For the help of new commissions or new departments for the prevention of blindness, the National Society is planning to assemble information on the prevention of blindness activities of state commissions for the blind, covering the following aspects:

1. Specific legislation authorizing commissions to engage in the prevention of blindness;
2. Specific appropriations made to commissions for the prevention of blindness;
3. An account of specific work undertaken by commissions in the prevention of blindness;
4. Future possibilities for work in this field.

Should the findings warrant a report, copies will be made available to commissions for the blind and to the membership of the American Association of Workers for the Blind.

A Study of Occupations of Partially Sighted Boys and Girls*

Marguerite Kastrup

THIS is a three-year survey of occupations undertaken by former sight-saving class pupils. The suitability of certain types of work is indicated for specific visual handicaps

EVERY sight-saving class teacher is confronted with the question: "What can children with seriously defective vision do after leaving the sight-saving class?" It may be asked by a parent when he enrolls his child in the class; it may come from a casual visitor. It was upon the lips of every foreign representative during the World Conference on Work for the Blind held in this country a few years ago. The supervisor in charge of a group of nurses who were visiting a class almost immediately asked the same question.

This study, covering a period of three years, will in a measure answer the question. It must be understood, however, at the outset, that the list of occupations prepared as the result of this study is merely suggestive. Because the amount of vision required in various occupations may be the determining factor, the teacher must be very careful to warn every student to consult his oculist before entering any type of work.

A committee, composed of three sight-saving class teachers, representing the northern, central and southern sections of Ohio, formulated the following questionnaire, copies of which were forwarded to all Ohio sight-saving class teachers. They, in turn, sent them to all former sight-saving class students who were, or had been, engaged in some work since leaving school.

* Conducted by the Ohio Sight-Saving Class Teachers Organization.

Copy of the Questionnaire

My dear ———

We are interested in knowing what has happened to former sight-saving class students. Information concerning work which you have done since leaving school will be of help to pupils still in school. Will you help us by answering these questions which are being sent to all former sight-saving class pupils in the state?

1. Name Date
2. Address
3. Grade last attended. Date
4. Are you a high school graduate?
5. What college training?
6. What vocational training have you had?
   a. Do you consider it was valuable?
   b. List courses.
7. Has your eye condition made it harder to keep work?
8. What work has been harmful to your eyes?
9. What work have you liked best?
10. List all jobs you have held.

Comments

Help to make replies from former pupils in our city 100 per cent.

Please reply at once and return sheets not later than January 17 to —

(Name and address of teacher sending the questionnaire.)

The number of questionnaires returned was most gratifying considering the difficulties in locating former students and the amount of unemployment at this particular time. A total of 233 questionnaires was returned.

Employment Status, Former Sight-Saving Class Pupils, Ohio Public Schools

	Boys	*Girls*
Myopes having been employed	27	25
Myopes unemployed	3	4
Myopes in college	1	1
Low visioned pupils having been employed	79	48
Low visioned pupils unemployed	9	15
Low visioned pupils in college	1	1
Blind	0	2
Still in school	4	4
Returned to regular school	1	3
Not filled out	2	3
	127	106

The answers to question 7, "Has your eye condition made it harder to keep work?" may be less than accurate because the student may have felt that he was being checked too closely, and might lose his position. Compilation showed that, of the 27 boys with myopia, 14 reported that their eye condition made it harder to keep work; this answer was also found in the replies of 19 of the 25 girls with myopia; 30 of the 79 boys with low vision; and 16 of the 48 girls with low vision.

The fear of losing his position may also have influenced the answers to question 8, "What work has been harmful to your eyes?" However, some students listed occupations which have been harmful to their eyes.

Myopic boys considered harmful to their eyes: being a theatre usher (reading tickets); work with machines; office work; threshing (dust); caddying; drafting; and newspaper writing. Girls who are myopes found harmful to their eyes: sewing; bookkeeping; and trimming small articles.

Among boys with low vision, night truck driving, office work, electrical welding, reading musical scales, stockroom work (reading labels), working in a bowling alley, being a fireman on a lake steamer, work under artificial light, upholstering, printing, and night factory work were occupations that were harmful to their eyes. Girls with low vision found office work, sewing, bookkeeping, soldering and wiring, and clerking harmful to their eyes.

Occupations best liked by myopic boys included: farming, mechanical work, maintaining a newsstand, clerking, horticulture, auto repairing, and work in a foundry; being a timekeeper, factory laborer, messenger, porter, board marker in a brokerage office, landscape gardener, and musician. Myopic girls enjoyed: housework; clerking; being a beauty operator; playing the accordion; being nursemaid and private graduate nursing.

Boys with low vision reported among occupations best liked: embalming; peddling bills; clerking; baking; radio work; printing; dry cleaning; being in the Coast Guard; auto repairing; farming; work in a greenhouse; being a mechanic, radio engineer, and musician. Low visioned girls liked office work; housework; nursing; clerking; being nursemaid, entertainer, waitress, beauty operator, packer, and working in a shop.

Educational and Vocational Status of Former Sight-Saving Class Pupils—Ohio Public Schools

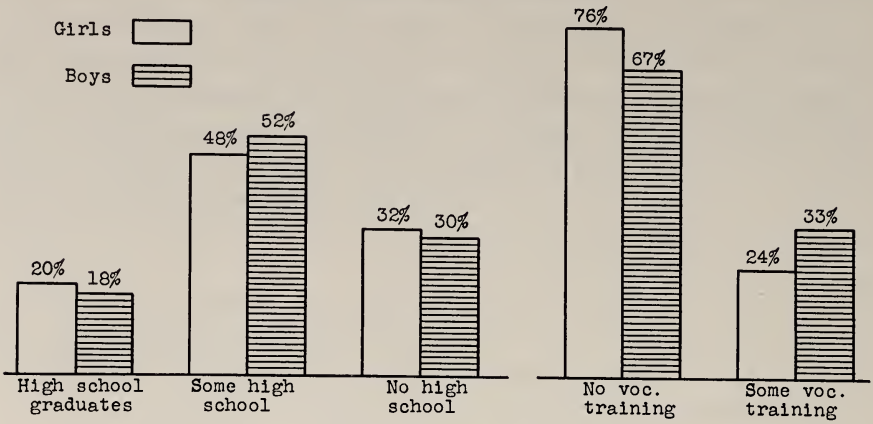

Fig. 1.—Myopes

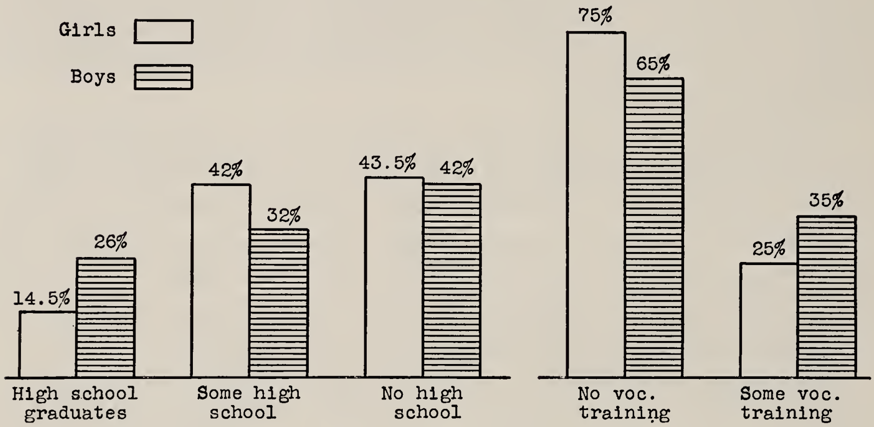

Fig. 2.—Low-Visioned

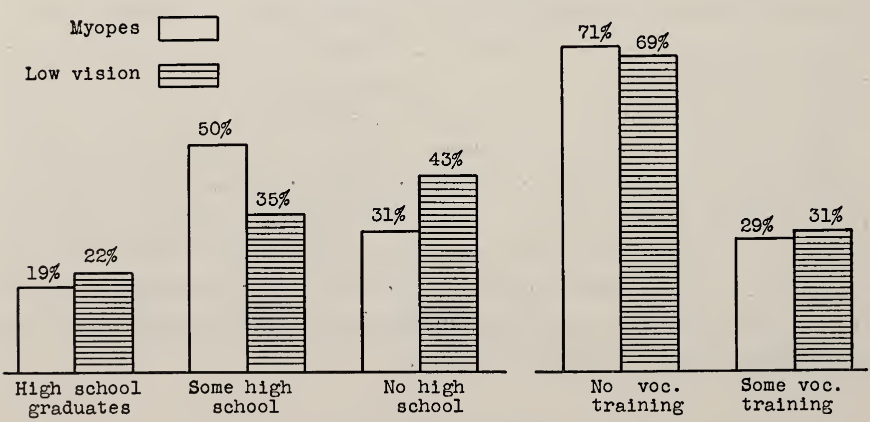

Fig. 3.—Entire Group

From the questionnaires sent to former sight-saving class pupils in Ohio public schools, the following lists of all types of occupations held by them have been assembled. The lists were checked by oculists, supervisors of sight-saving classes, vocational and industrial counselors, high school sight-saving class teachers and a representative of the National Society for the Prevention of Blindness. Occupations which may be satisfactory for myopes and those having low vision from the ocular point of view, according to the consensus of authorities consulted, are indicated by an asterisk.

Occupations Followed by Former Sight-Saving Class Pupils

Myopes

Boys	*Girls*
Factory	
Brick maker	*Wrapping and packing articles
Mattress maker	Trimming small articles
Wood finisher	Sewing in an overcoat factory
Metal worker	Trimming hats
*Stockroom manager	Finishing sweaters
*Tire rebuilder	Jig-saw puzzle cutting
Battery rebuilder	
*Work in an ice factory	
Work in a foundry	
Personal Service	
*Waiter	*Housework
*Bus boy	*Catering
*Porter	*Nursemaid
*Odd jobs in hotel	*Cooking
	*Waitress
	*Beauty operator
Office Work	
Office boy	Bookkeeping
Professional	
Musician	*Musician
	*Graduate nursing
Selling	
*Grocery store clerk	*Five and ten cent store clerk
*Life insurance agent	*Creamery clerk
*Music store clerk	*Department store clerk
*Auto supplies clerk	Grocery clerk
Radio and battery department assistant	Assistant cashier in a store
Radio store—credit manager	*Wrapper in a store
Automobile salesman	

MYOPES—(*Continued*)

Boys	*Girls*
Outdoor Work	
*Landscape gardening	
*Farming	
Trucking	
*Cement worker	
*Straw bailing	
Mail carrier, assistant	
Road construction	
Stone quarrying	
Laborer (East Ohio Gas Co.)	
Section laborer	
*Newsboy	
Threshing	
Silo filler	
*Western Union messenger	
*Caddy	
Lumberjack	
*Horticulturist	
*Deckhand on steamer	
Miscellaneous	
Radio repair	
*Errand boy	
Presser—dry cleaner	
*Paper route inspector	
*Laundry	
Newspaper writer	
Brokerage boardmarker	
*Theatre usher	

LOW VISIONED

Factory	
Toy maker	Inspector, paper products company
Plate preparing	Inspector, milk caps and butter cartons
*Candy maker	*Pretzel factory
Coil winder	Blanket factory
*Splitting willows (basket factory)	Soldering and wiring
*Packing wares for shipment	*Packing metal ware
Pressman (steel mills)	*Soap packer
Heater helper (steel mills)	Machine operator
Fitter	*Canning factory
*Dairy factory worker	*Candy factory—dipper
*Bottle washer	Power sewing
Copper and iron worker	Power knitting
Foundry worker	

Low Visioned—(*Continued*)

Boys	*Girls*
Factory	
Sand blaster	
Hosiery and knitting factory	
*Ware boy	
*Order boy	
Stationery engraver	
*Timekeeper	
Office Work	
*Shipping and receiving clerk	Typist
Bookkeeper	Bookkeeper
Typist	*Switchboard operator
	*Telephone operator
Personal Service	
*Porter	*Housework
*Chef	*Waitress in restaurant
*Shoeshiner	*Nursemaid
*Restaurant worker	*Beauty parlor operator
	*General work in hospital
	*Nurse's aid
	*Cooking
Selling	
*Clerk, sweet shop	*S. Kresge clerk
*Shoe clerk	*Bakery clerk
Jewelry clerk	*Dairy clerk
*Creamery clerk	*Grocery clerk
*Department store clerk	*Department store clerk
*Hosiery salesman	*Fruit store clerk
*Vacuum cleaner salesman	*Shoe store clerk
*Paper products salesman	
*Magazine and Christmas card salesman	
*Cosmetics salesman	
*Publicity house salesman	
*Grocery clerk (A. & P.)	
*Second-hand furniture clerk	
*Ice cream parlor clerk	
*Fruit store clerk	
*Power and light salesman	
Professional and Social Service	
*College professor	*Factory nurse
*Orchestra player	*Musical entertainer
*Salvation Army worker	*Volunteer teacher—school for cripples
*Licensed masseur (suggested)	*Radio singer (suggested)

Low Visioned—(*Continued*)

Boys	*Girls*
Outdoor Work	
Truck driving	
*Newsboy	
Census enumerator	
House-to-house canvassing	
*Peddling bills	
*Road construction	
*City Forestry Department	
*Auto parking	
*Gas station attendant	
Jumper on magazine route	
*Helper on coal truck	
*Poultry raising	
*Farm work of all kinds	
Express delivering	
Railroad section work	
*Landscape gardening	
Outdoor painting	
*Delivery boy	
*Fish peddler	
Chauffeur	
Coast guard	
Miscellaneous	
Mechanical dentist's assistant	
*Embalming assistant	
*Upholstering assistant	
Auto repair work	
Radio repair work	
Laundry work	
Machinist	
*Dry cleaning (presser)	
*Newspaper reporter	
Photo finisher	
*Baker	
Printing (odd jobs)	
Elevator operator	
*School janitor	
*Theatre usher	
*Pin setter, bowling alley	

After checking the entire list of occupations, the advisability of some was questioned, from the standpoint of employer and employee, by oculists, social and industrial workers, nurses and supervisors. The amount of vision required in these occupations

may be the determining factor. Therefore an oculist should be consulted before encouraging a sight-saving class student to enter these occupations, typified by the following list:

Foundry work; machine worker (danger to others); elevator operator (danger to others); truck driver (danger to others); chauffeur (danger to others); railroad section work (danger to others); soldering and wiring; power sewing; mail carrier; printing; manicuring; radio repair; graduate nursing; inspector of paper products; bookkeeping; mattress making; any clerking requiring a large amount of eye work; newspaper writing; plate preparing; occupations requiring heavy lifting (hazardous for myopes); metal worker; and census enumerator.

Editorial

Goggles Do Save Sight!

WE hear frequently that goggles save eyes, but this statement and all its variations rarely produce a good mental picture of just how they save eyes. Here are two photographs and a brief letter from the safety director of the General Electric Company which, it seems to us, illustrate vividly how goggles save eyes.


Goggles saved his eyes

Mr. Louis Resnick, Director, Industrial Relations,
National Society for the Prevention of Blindness,
New York City

My dear Mr. Resnick:

You might be interested in the enclosed photograph showing what happened to a pair of goggles. The man shown was putting fresh metal in a solder pot and it is thought that a pig of solder contained a moisture-filled blow hole.

He had been working on that job for eighteen years, this was the first splash in his experience and the first time that anything had ever hit his goggles.

Yours very truly,

Signed: G. E. Sanford

Pictorial Review

THE SIGHT-SAVING REVIEW presents in pictorial form one of the many aspects of sight conservation. Subsequent issues will contain other topics in illustrated form. The National Society for the Prevention of Blindness offers, for loan, slides and photographs on these subjects

Preschool Vision Testing

1. "Which way does the 'little animal' point his feet?" Everyone in the group knows that!

Testing the visual acuity of young children is not a difficult task when we make a game of it. By calling the vision testing symbol a "little animal," the interest of the young child is aroused. He answers the question, "In what direction are the little legs pointing?" by pointing his arms in the same direction. He is a participant instead of a subject under observation.

The importance of screening out children with visual defects before the heavy eye tasks of school life are begun is recognized by physicians and educators. Even three-year-olds play the game without difficulty.

2. Joe and Sally show that they know how to play the game

3. The "little animal" is seen through a window

4. Each eye is tested alone at the twenty-foot distance

5. Clear eyes and healthy lids indicate general good health

The Forum

THIS section is reserved for brief or informal papers, discussions, questions and answers, and occasional pertinent quotations from other publications. We offer to publish letters or excerpts of general interest, assuming no responsibility for the opinions expressed therein. Individual questions are turned over to consultants in the particular field. Every communication must contain the writer's name and address, but these are omitted on request

International Collaboration for Prevention of Blindness

International efforts to improve public health not only are assured of collaboration among nations, because of the non-political nature of such work, but serve the additional purpose of furthering understanding among individuals. To those who have participated in the development of the International Association for Prevention of Blindness, certainly, the personal friendships originating at annual conferences and maintained through correspondence have meant a closer relationship between the representatives of different nationalities than would have been likely without a common goal.

The seventh annual meeting of the Association was held in London in April, 1935, concurrently with the annual meetings of the Ophthalmological Society of the United Kingdom and the International Organization Against Trachoma. The latter group, which includes the world's leading trachoma specialists, has met jointly with the International Association for Prevention of Blindness on several other occasions. This is indeed fitting, since trachoma remains the greatest single worldwide cause of blindness. In the United States, fortunately, this eye disease is prevalent only in the Ozark and Appalachian mountain districts of Missouri, Arkansas, Kentucky, Tennessee, southern Illinois and West Virginia. It constitutes a comparatively minor cause of blindness in our country, in contrast to its predominance in Egypt, China, Japan, India, Palestine and Russia.

Allies in War on Blindness

Delegates from a score of countries attended the London conference, coming from as far as Egypt

and Brazil. Thirty-eight nations are now represented in the Association, and national committees in twelve countries are affiliated with it. Each year's recapitulation shows some definite progress; 1935, for example, included the establishment of national societies for prevention of blindness in Brazil and Algeria. Gradual penetration of sight-saving gospel into far corners of the globe is accomplished, moreover, with extremely limited funds. Having been established in September, 1929, on the eve of the economic depression, the Association never has had an annual budget exceeding $5,000. Contributions from countries other than the United States now constitute two-thirds of the income. Despite the leanest of financial diet, the Association has remained alive and keeps going along its modest course until more propitious times will enable the Secretariat in Paris to carry out fully all of these duties:

1. Act as a clearing house for all national or local agencies interested primarily in sight conservation;
2. Provide information to agencies indirectly concerned which may wish to include prevention of blindness as part of a larger program;
3. Collect, evaluate and consider information concerning all public and voluntary activities for the prevention of blindness; summarize publications; issue translations in current languages of material believed to be of value;
4. Suggest legislation and regulation;
5. Promote international, national and local organization dealing with the preservation of sight;
6. Promote research as to the causes of blindness;
7. Undertake all necessary steps to provide resources for the Association.

Common Problems Discussed Annually

Each year, one or two important topics are presented to the annual meeting by outstanding authorities, with time permitted afterward for general discussion. At the London conference, Professor M. Van Duyse of Belgium presented a paper on "The Classification of the Causes of Blindness," and Dr. A. Franceschetti of Switzerland presented a paper on "Hereditary Diseases of the Eye Resulting in Blindness; Their Social Consequences; Measures That May Be Proposed." Professor Van Duyse reported that the chances of becoming blind are highest in the first two years of life, due chiefly to ophthalmia neonatorum and corneal lesions. He urged that statistics be collected uniformly in all countries, these figures to include not only those who are totally blind (incapable of perceiving light) but those whose visual power is so reduced as to

make them unable to perform work for which eyesight is essential.

To prevent blindness from hereditary eye diseases, Dr. Franceschetti suggested that facilities for sterilization be made available to those who have such diseases. He advocated also the special training of physicians, particularly ophthalmologists, in genetics; the education of public health officials and the general public on this subject; a decrease in consanguineous marriages; the collection of precise and complete statistics; the increased use of social workers; and the general introduction of pre-marital health certificates.

In the absence of President de Lapersonne, through illness, the presiding officer in London was Dr. Park Lewis, of Buffalo, New York, the vice president. Professor Van Duyse was elected Secretary-General, to succeed Dr. Humbert, whose medical work in Switzerland no longer permits sufficient time for the responsibilities of the office. Dr. Alix Churchill was re-elected Associate Secretary-General, and Mr. Lewis H. Carris was re-elected American Correspondent. The next annual conference will be held in Paris in May, 1936, in conjunction with the meeting of the French Ophthalmological Society; and the 1937 conference will be held in Cairo in conjunction with the International Ophthalmological Congress.

History of International Movement

The conference of the International Association in London helped to focus attention on the splendid research work of the English Prevention of Blindness Committee which was formed in 1930. England may be credited, perhaps, with laying the foundation of the sight conservation movement. The seed planted by twenty-eight nations at The Hague on September 14, 1929, when the International Association was founded, took root in soil which England fertilized half a century ago and which the United States nourished. Shortly after Dr. Carl Siegmund Franz Credé discovered the method of preventing ophthalmia neonatorum through prophylaxis, there was established the London Society for the Prevention of Blindness, dedicated chiefly to making Dr. Credé's discovery widely known. The outstanding achievement of the early London Society was its publication of a remarkable essay on prevention of blindness by Professor Ernst Fuchs, of Vienna, who was awarded the Society's prize for the best treatise on this subject at the Fifth International Congress of Hygiene in 1884.

Popular interest in the Society diminished in England, but a similar movement in America was born in 1908 when the New York State Committee for the Prevention of Blindness was established. The inspiration was a report which Dr. Park Lewis made to the New York

State Legislature in 1907, as president of a special commission to investigate the condition of the blind. The report stated that "in the study of blindness throughout the State of New York, as elsewhere, the members of your Commission have been profoundly impressed with the fact, which has constantly forced itself on their attention, that a large part of it was unnecessary and preventable."

Like the program of the old London Society for Prevention of Blindness, the objective of the New York State Committee at first was mainly to acquaint health officials and the public with the possibilities for the prevention of blindness among newborn infants, through the use of silver nitrate. Soon, however, the Committee's purpose was broadened to include the conservation of vision among older children and adults. Again, America looked to England, examined her special classes for school children suffering from progressive myopia, and perfected the sight-saving classes for children with seriously defective vision which may now be found in one hundred and forty-seven communities throughout the United States. The enlarged interest of the American group extended not only to sight-saving classes, but included the protection of the eyes of industrial workers in hazardous occupations and other means of saving sight through co-operation with the medical and nursing professions, educators, social workers, illuminating engineers and civic leaders. The State Committee subsequently evolved into the National Society for the Prevention of Blindness.

The need for a worldwide organization to serve as a clearing house for existing agencies in this field and to stimulate the establishment of similar groups in other countries had long been recognized by leaders in the work of conserving vision. Dr. Park Lewis, who was largely responsible for the establishment in the United States of early activities for the protection of eyesight, put forward a plea for world co-operation in his address before the Oxford Ophthalmological Congress in 1924. This suggestion was followed up the next year by Mr. Treacher Collins of England, honorary president of the International Congress of Ophthalmology, who spoke on "The Elimination of Eye Disease" and incidentally made the statement that "international co-operation against a common foe such as disease is the most likely way to secure international peace."

In 1924 the National Society began definitely to study the possibilities of a worldwide program along the lines of its work in the United States. This was inaugurated at the request of the Section on Ophthalmology of the American Medical Association. The Society was in touch with the health sec-

tion of the League of Nations, the International Organization Against Trachoma, the League of Red Cross Societies, and other interested organizations; and when the Second Pan American Conference of the Red Cross met in Washington, D. C., in 1926, the conference recommended that Red Cross Societies "co-operate in the prevention of blindness as well as in the creation of workshops for the blind, with a view to arousing public interest in the medico-social problem of blindness."

Two years later, in 1928, the American National Society collaborated with the League of Red Cross Societies in studying the international field. A report, published in 1929, estimated the blind population of the world to be at least 6,000,000 and called attention to the fact that such a figure "takes no account of that much larger group with vision so seriously defective as to be handicapped vocationally and threatened with ultimate loss of sight." The report dealt only with the major causes of blindness—trachoma, syphilis, gonorrhea, ophthalmia neonatorum, smallpox, glaucoma, congenital defects and accidents. In the same year a comprehensive report on the "Welfare of the Blind in Various Countries" was published by the Health Section of the League of Nations, furnishing much additional information on causes and prevention of blindness.

What Constitutes Blindness?

Both the Red Cross and the League of Nations reports pointed out the fundamental need for a standard definition of blindness—one that would serve as the statistical standard for workers concerned with the many sociological implications of blindness, quite aside from a purely ophthalmological definition having precise measurements of visual acuity.

In the United States, the generally accepted definition has been "inability to see well enough to read even with the aid of glasses;" or, for illiterates, "inability to distinguish forms and objects with sufficient distinctness." In Great Britain, the statute providing for the education of blind children describes them as "too blind to be able to read the ordinary school books used by children;" and the Blind Persons' Act defines a blind person as "one who is so blind as to be unable to perform any work for which eyesight is essential."

Any attempt to define blindness, if it is to be comprehensive, must take into consideration a special category for those partially sighted children who do not fit in either ordinary school classes or in schools for the blind. It is important that children—and adults too—whose sight is below average be identified as "partially sighted" rather than "partially blind." The great interest of the International Association in conserving the remaining vision

of those who fall within this classification caused it to devote the entire annual meeting in 1932 to sight-saving classes, with addresses by experts from England, France, Germany, Switzerland, and the United States.

Co-operation from League of Nations

The Child Welfare Committee of the League of Nations has shown that it construes the work of sight-saving classes to be in line with the policy set forth in the Children's Charter adopted by the League "to ensure the normal development of each child by every means." A report submitted to the Committee by the International Association for Prevention of Blindness in 1931 pointed out that "some countries are further advanced than others, and their long experience carries conviction, but other countries have been slow to follow their example."

The League of Nations has also interested itself in the effect of motion pictures on eyesight. An investigation of this, followed by the publication of a report, was made by the International Educational Cinematographic Institute of the League in 1930.

Safeguarding the eyes of workers, which becomes increasingly important with the continued mechanization of industry, is of concern to the League of Nations through its International Labor Office. The American National Society for the Prevention of Blindness has been engaged for many years in a campaign to reduce the number of eye accidents in industry, and a study of the problem as it pertains to France has been made for a group of the largest French insurance companies by Professor de Lapersonne.

In addition to the various agencies already mentioned, several others might be listed as collaborators in the international movement for prevention of blindness. Only the barest start has been made, however, in this struggle to protect millions unborn, as well as those now living, from condemnation to a world of darkness. We know that, with the aid of science and education, the number of blind in the world can be reduced to at least half of the present total. With this knowledge as a stimulus, all the forces striving to conserve vision look forward hopefully toward a future in which mankind will be enlightened both literally and figuratively.

David Resnick
National Society for the Prevention of Blindness

Communication

Apropos "Fenestration and Natural Lighting"

The following communication was addressed to the authors of "Fenestration and Natural Lighting," Messrs. Alfred H. Fletcher, Theodore F. Foster, M.D., and Daniel H. Goodnow, Jr., who, together with the author of the communication, consent to its publication here.

I have read with a great deal of interest your article, "Fenestration and Natural Lighting," which appears in THE SIGHT-SAVING REVIEW for June, 1935. I must confess that your opening sentence, "Judging by the scientific literature on the subject of illumination, the problem of natural lighting has not received from illuminating engineers the attention that artificial lighting has," put me slightly on the defensive. In reading the article through, however, I saw that you were familiar with the considerable amount of work which has been done by illuminating engineers and I then agreed with the statement as you made it. It is true that natural lighting has not received as much attention as artificial lighting.

I would, therefore, like to make a little explanation as I believe it will prove to you that the Illuminating Engineering Society has at least made a very honest attempt to correct this state of affairs.

The Illuminating Engineering Society was organized in 1906 for the advancement of the theory and practice of illuminating engineering and the dissemination of knowledge relating thereto. Ever since its inception this Society has been a forum for the discussion of all phases of lighting, natural and artificial. In artificial lighting both gas and electricity have played important parts and if other means of artificial lighting were at all susceptible to engineering treatment, they would be considered.

In the early days of the art, gas was much more widely used for lighting than it is now and many of our members represented gas interests. At the present time we have in the neighborhood of 1,500 members and it may be safely said that the great majority of these are directly or indirectly connected with the electric lighting industry. In spite of this we make every effort to remain a thoroughly scientific, neutral body.

As far back as 1918 a committee was formed to consider problems of natural lighting. At that time it was known as the Committee on Sky Brightness. It is now known as the technical Committee on Natural Lighting. Ever since that time a relatively high percentage of our *Transactions* have been devoted to the presentation of papers on natural lighting. I have not the time to correlate what proportion of the pages cover natural lighting subjects, but in some years it runs

fairly high. In as much as a very, very small number of our members are directly or commercially interested in natural lighting as their sole interest, I feel we have done a wonderful job in thus devoting this large amount of attention to the subject in the general interest of the art.

As you have no doubt found, there is a veritable wealth of research data in the last fifteen volumes of the *Transactions*. It is rather hard, however, to dig this out and make it directly applicable to problems with which you are faced. The principles of correct natural lighting for interiors are apparently pretty well defined and understood by those who specialize in it. The material, however, is not in such shape that the man who wishes to use it can do so readily.

When I appointed the new Committee on Natural Lighting for my administration I told the chairman that I considered his biggest job that of simplifying the data already available and codifying it so that it could be used more easily. I believe that the committee has already done some work along this line and I hope that before many months transpire the Illuminating Engineering Society can obtain from authors like you the proper credit for the work they have been doing for years. I do not say this in any sense of criticism but merely as an indictment of ourselves that we have never fully popularized the research which has been carried on through our committees.

A. L. Powell
President, Illuminating
Engineering Society

Current Publications on Sight Conservation

Note.—The National Society for the Prevention of Blindness presents its current list of publications. Except for the more expensive ones, single copies are sent free upon request. Unless otherwise specified, they are reprinted from The Sight-Saving Review. New publications will be announced quarterly.

167. **"Thousands Injured in Fourth of July Celebration."** Red, white and blue, 17″ x 22″. 5 cts.
    Poster showing types of injury as result of Fourth of July celebration accidents.

168. **"Is the Fourth of July Sane and Safe?"** 17″ x 22″. 5 cts.
    Poster of newspaper clippings that tell of Fourth of July celebration accidents.

169. **Medical Social Service in an Eye Clinic,** Amy G. Smith. 16 p. 15 cts.
    The medical social eye worker is an important agent in the conservation of vision program.

170. **Fenestration and Natural Lighting,** Alfred H. Fletcher, Theodore F. Foster, M.D., and Daniel H. Goodnow, Jr. 16 p. 10 cts.
    Natural lighting for homes, schools and work-places demands scientific study of window placement.

171. **Some Causes of Blindness,** T. H. Farrell, M.D. 8 p. 5 cts.
    Among the causes of blindness are discussed: hereditary factors, prenatal influences, infectious diseases, cancer, drugs, and accident.

172. **The Social Significance of Better Sight,** James E. Ives. 12 p. 10 cts.
    Efficiency in production is greatly aided by promoting visual efficiency among workers, according to studies made by the United States Public Health Service.

173. **The Co-operation of the Physician and the Safety Engineer in Saving Sight,** C. O. Sappington, M.D. 8 p. 5 cts.
    The collaboration of the industrial physician with the safety engineer is required for an efficient program of sight conservation in industry.

174. **Arithmetic Ability of Sight-Saving Class Pupils in Cleveland, Ohio,** Olive S. Peck. 8 p. 5 cts.
Sight-saving class pupils are shown to be able to work up to the limit of their mental ability in arithmetic when given enough time and when material is in a form which they can see, regardless of eye defect.

175. **Your Child's Eyes,** A. C. Snell, M.D. 12 p. 5 cts.
Advice to parents on eye hygiene for the school child.

176. **Eye Health of Young Children,** Anette M. Phelan, Ph.D., and Grace Langdon, Ph.D. 16 p. ill. 10 cts.
Visual defects may be corrected and good eye habits instituted during the preschool years if the parent and the nursery school teacher are alert to their responsibilities for eye health.

177. **Activities of State Commissions for the Blind in the Field of Prevention of Blindness,** Lewis H. Carris. 8 p. 5 cts.
Exposition of the responsibilities and possibilities of state commissions in preventing loss of sight.

178. **Industrial Eye Protection.** 5 charts, 8″ x 11″. The set, 20 cts.
Posters showing: (1) How Eyes Are Injured; (2) How Costly Are Eye Accidents? (3) Eyes Can Be Saved in Industry; (4) Eyes Saved in Industry in Two Recent Years; (5) First Aid for Eye Injuries.

179. **Trachoma Among American Indians,** Sidney J. Tillim, M.D., 12 p. ill. 10 cts.
A plea for more effective trachoma service to Indians of the Southwest, among whom trachoma is particularly prevalent.

180. **A Study of Occupations of Partially Sighted Boys and Girls,** Marguerite Kastrup, 12 p. 10 cts.
The survey of occupations followed by former Ohio sight-saving class pupils shows vocations followed; the suitability of certain types of work is indicated.

181. **Preschool Vision Testing—A Pictorial Review.** 4 p. ill. 5 cts.
Pictures tell the story of testing the vision of young children.

182. **International Collaboration for Prevention of Blindness,** David Resnick, 16 p. 5 cts.
A résumé of the international movement for the prevention of blindness since its beginning in 1929; highlights of the seventh annual meeting in London indicate its broad field of study.

183. Goggles Do Save Sight. 1 p. ill.

Photographs that testify to the fact that goggles save the eyes.

D79. A Second Grade's Story of Lights, Mildred Bush. Reprinted from *Childhood Education*, Vol. XI, No. 3, December, 1934. 12 p. 10 cts.

The evolution of lighting was made real to a group of children who themselves recreated a history of lights.

D80. The Care of the Eyes in Measles, Louis Lehrfeld, M.D. Reprinted from *Hygeia*, May, 1935. 2 p. ill. 5 cts.

Outline of eye hygiene for the measles patient.

D82. Lighting the Rural School, Winifred Hathaway. Reprinted from *Public Health Nursing*, September, 1935. 4 p. ill. 5 cts.

Practical suggestions for better light in the country schoolhouse.

D83. Sight-Saving Classes, Conrad Berens, M.D., and Winifred Hathaway. Reprinted from *American Journal of Ophthalmology*, September, 1935, 8 p. 5 cts.

Presents the history of the sight-saving class movement, its present status, and its possibilities for future development. This was originally presented before the section on ophthalmology of the New York Academy of Medicine.

Note and Comment

Eye Care for Growing Children at Home.—In making suggestions for the decoration and arrangement of a room for the use of a boy or girl past the nursery age, Florence B. Terhune says, in the May issue of the *National Parent-Teacher Magazine*, "But what is very important, and less talked of, is that the room should be arranged for lighting convenience. . . . How many times you see a child prone on the floor with his book and only a fifty-watt bulb in the ceiling fixture eight feet away, if he is lucky enough to be directly under it. What he needs is at least a sixty-watt bulb in a desk or floor lamp where he is reading, and a stronger bulb when the fixture is farther from his book. Another point is to have the drawing board and writing desk adjustable to a slanting position, if possible, for this further avoids eyestrain. . . . We might better, then, skimp on curtains and extras, if necessary, than stint on lamps or adequate lighting facilities."

Campaign Against Blindness in India.—At the fourth conference of the All-India Ophthalmological Society the urgent need for a forceful program of prevention of blindness was emphasized, and resolutions for submission to the authorities were adopted. The seven-point program included efforts to reduce ophthalmia neonatorum; the reduction of keratomalacia through study of dietary needs and ways of remedying food deficiency; investigation into the reports of high frequency of trachoma in the Indian army, a potential civilian menace; the inspection of the eyes of school children; the improvement of the anti-smallpox efforts; the development of educational channels, reaching the masses with the prevention of blindness message; and the extension of venereal disease control to eliminate the blindness caused by syphilis and gonorrhea.

A recent leaflet, "The Prevention of Blindness in India," released in India through the Junior Red Cross, makes a commendable start in public education. The preface states: "This pamphlet is issued for the use of Junior Red Cross groups, but it will

probably be found useful by other organizations and the general public. It is hoped that the members of the Junior Red Cross groups will not only read and carry out the advice which is given in the following pages, but also launch sight-saving campaigns in their schools and villages. . . ."

Prevention of Blindness in South Africa.—Projects being stressed by the South African Council for the Blind, in their prevention of blindness program, include efforts to enforce the regulation providing for compulsory use of a prophylactic in the eyes of newborn infants, a law that is, according to the Council's report, more honored in the breach than in the observance. An effort is also being made to enforce restrictions on the sale of spectacles by unqualified persons. Hope is expressed that the department of public health will undertake an inquiry into the causes of blindness within the Union. Vigorous efforts are being directed to developing an educational campaign that will reach all sections of the population. One of the weapons used is the film, "Preventing Blindness and Saving Sight," produced under the auspices of the National Society for the Prevention of Blindness.

Prevention Emphasized at Convention on the Blind.—The growing emphasis that workers for the blind place upon the prevention of blindness was apparent at the biennial convention of the American Association of Workers for the Blind at Louisville. Mary E. Ryder, executive director of the Missouri Commission for the Blind, in her paper "In What Proportion Should Emphasis Be Placed on Prevention of Blindness, the Employment of the Blind Both Industrially and Occupationally, and Relief for the Unemployable?" said:

"With 8,147 known blind people in Missouri, and with the knowledge that adequate measures to discover cases early and to furnish proper treatment would prevent 75 to 90 per cent of blindness, there can be no dispute that first consideration should be given to the conservation of vision, prevention of blindness, and to the salvaging of sight. While it is true that by preventing blindness the state department of education is saved money (because it costs more to educate a blind child than a sighted one); the State Commission for the Blind is probably saved the yearly

payment of the blind pension, and the added expense of conducting sheltered work shops; yet the greatest saving cannot be computed in dollars and cents, for we cannot estimate the real economic loss to the state when a citizen loses his sense of sight."

This far-sighted view of the problem of the blind has resulted in the appropriation by the Missouri Legislature of $50,000 as a budget to be used by the Commission for the Blind in an effective prevention of blindness program.

International War Against Trachoma.—With the tightening of international bonds, as well as the recent concentration of interest in North Africa, the worldwide war against trachoma becomes increasingly important even to those countries where the trachoma problem is comparatively slight. From the report of the Ophthalmic Section of the Department of Public Health in Egypt comes the statement that of 10,066 school children examined, 98 per cent were found infected with trachoma, and 44 per cent of them were seriously affected. Dr. A. C. MacCallan, recently elected president of the International Organization Against Trachoma, succeeding Prof. de Grosz, pointed out methods of prevention in a talk at the annual meeting of that organization in London. He urged personal prophylaxis, prophylaxis in the family, in the school, in the army and navy, and national and international prophylaxis, as carried out by the United States and Canada. "Because of the comparative rarity of trachoma in Europe," he added, "the function of the International Organization is very clearly defined, to act as a clearing house for scientific study of worldwide control of trachoma."

Finding Hygiene Problems in Industry.—In an effort to clarify important industrial hygiene problems in a typical industrial area, an industrial study was made by the United States Public Health Service. For the purposes of the survey, 615 plants, representing ten main industries, were studied over a period of seven weeks. The metal products industry made up 48.7 per cent of the whole. Plants having ten or less employees constituted nearly half of those studied. This closely follows the general industrial distribution in the United States as a whole. It was found that only 5 per cent of the plants and 20 per cent of the workers were provided

with a part- or full-time safety director, most of them being found in the tenth having over 100 workers in the plant. Medical and nursing services were found in about the same proportions. Among 19 per cent of the workers the common towel is in use and 13 per cent use a common drinking cup. Unguarded moving machinery was the most common potential source of accidental injury; floor hazards ranked next. About 7.5 per cent of the workers were not protected against the possibility of eye injuries from flying particles.

This study confirms the statement made by Dr. Elbert S. Sherman at the conference of the National Bureau of Casualty and Surety Underwriters that, despite the advances made by safety education and the great reduction in the number of eye accidents in industry, trauma is still one of the leading causes of blindness in this country. For every eye made blind as the result of an accident, there are probably fifty with lesser but serious degrees of visual impairment. In large plants, where a safety director has authority to correct safety abuses, such as carelessness about wearing goggles, laxity of enforcing the goggle rule, and faulty illumination, accidents are less frequent. It is in the small machine shops, automobile repair shops, and garages, that accidents most frequently occur, and where there is still the greatest need for education in eye protection.

Preschool Refraction in London.—In a study of the vision of 1,344 children, between the ages of four and eight years, in the primary schools of London, it was found that under atropine cycloplegia about 75 per cent of the children have between 0.5 and 3.5 diopters of hyperopia. The theory that refractive error occurs more frequently in Jewish children than in non-Jewish children is confirmed in this study that shows a greater prevalence of low hyperopia in Jewish children; this explains the greater frequency of myopia among Jewish children at the school leaving age of 14. The higher incidence of astigmatism, found among Jewish children, is explained, according to Arnold Sorsby, investigating ophthalmologist, as a recessive hereditary factor, more common among Jews because of racial inbreeding.

Daylight Glare Studied in Canadian Schools.—In order to study the incidence of daylight glare in several schools, and to deter-

mine whether or not the glare could be reduced by simple procedures, a survey was made of the glare conditions of four Ontario schools. In one school as many as 47 per cent of the pupils were subject to daylight glare; after certain simple precautions were taken—blackboards cleaned with coal oil; old boards resurfaced by scraping; desks shifted out of the line of reflected daylight; adjustable shades introduced where necessary—the total percentage of pupils subjected to glare fell to 9. The writers, Ruth C. Partridge and D. L. McLean, who report the study in the March *Canadian Public Health Journal*, conclude: "It should be the responsibility of the teacher to utilize properly the lights and blinds provided, to adjust the seating or writing on the board to avoid glare areas, and to keep the blackboard clean. The school board should make sure that each room is properly equipped with windows suitably shaded and with tilted blackboards having good dark surface, properly illuminated."

Making Night Driving Safe.—The headlight problem, a factor in the increased number of automobile accidents after dark, and a recurrent problem to safety engineers and automobile manufacturers alike, may never be satisfactorily solved, but recent developments and trends in roadway lighting may make the headlight problem immaterial. Safe night driving, without the use of headlights, with automobiles and pedestrians visible 2,000 feet ahead, has been demonstrated possible of attainment in a mile stretch of highway that is equipped with sodium vapor lights. This new member of the lamp family generates approximately three times as much light per unit as the lamps used ordinarily in highway lighting. It has been figured that the installation of sodium vapor lighting will result in the saving of approximately 6,000 lives and more than $50,000,000 in motor vehicle accidents annually, according to an article in the March *Safety Engineering*.

Says the National Bureau of Casualty and Surety Underwriters, "One-third of the night fatalities (15,500 in 1933) could have been prevented by adequate lighting." Further confirmation comes from a group of cities that increased its street lighting budgets 11 per cent and experienced a 25 per cent reduction in night fatalities. Another group reduced its street lighting budget 14 per

cent, and suffered a 7.6 per cent rise in night fatalities. As a guide to engineers and municipal authorities in planning adequate street lighting, the Illuminating Engineering Society has just published its standard Code of Street Lighting. Varying traffic conditions on different types of streets have been taken into consideration in preparing the recommendations.

Causes of Blindness in Spain.—There is a higher proportion of blindness in Spain than in many other countries, according to Dr. Marin Amat, secretary-general of the Spanish Committee of the International Association for Prevention of Blindness, writing in *Los Ciegos*. Official census figures, which are undoubtedly lower than is actually the case, show a 38,000 blind population, of whom 5,000 are children of school age; 80,000 persons suffer from trachoma, the leading cause of blindness in Spain. Leprosy, smallpox, and accidents, particularly among children, are other leading causes of blindness in Spain. Ophthalmia neonatorum and gonorrheal ophthalmia cause 18 per cent of the blindness in Spain, a percentage much higher than in countries where standards of hygiene are higher. A general plan of action for the prevention of blindness is outlined by Dr. Amat, and a plea made for all to join in the campaign to save sight.

Survey Finds Plant Lighting Low.—A survey, conducted by the *Electrical World*, shows that industrial plant lighting has suffered a severe decline; nearly 85 per cent of the plants in 1,249 cities in 36 states are using obsolete reflecting equipment. The average illumination intensity found in working areas was 2.85 foot-candles. In efforts to improve lighting in factories and reduce accidents in New York State, safety and illumination authorities are working with the State Labor Board and with insurance companies to get a reduction in industrial insurance premiums as a reward for installing good lighting.

Blind Man Aids Prevention.—William Henry Ross, of Edinburgh, Scotland, blinded by accident and illness, has contributed £40,000 to establish an organization in Edinburgh for research into the causes of blindness and practical measures for its prevention. The foundation, says the *New Beacon*, will be known as the W. H. Ross Foundation for the Study and Prevention of Blindness.

Medical Social Service in Great Britain.—The appointment of a fully trained ophthalmic nurse in the Birmingham and Midland Eye Hospital to supervise or treat eye cases, under the direction of a surgeon, promises to add to the progress of medical social service in Great Britain. According to a note in the *Annual Report* of the Union of Counties Associations for the Blind in England and Wales, this same hospital instigated, four years ago, a service utilizing two full-time externe nurses to treat cases of ophthalmia neonatorum; its success has made possible this second step. Provision for closer co-operation between ophthalmic hospitals and local voluntary societies for the prevention of blindness has been the means, in certain rural areas, of establishing contact with, and rendering assistance to, the potentially blind who might not have been discovered in time to save their sight.

Behavior Problems of Children With Reading Disability.—Dyslexia, or specific reading disability, not only reacts unfavorably on children's educational opportunities, but reflects unfavorably upon their behavior and emotional growth. Dr. Leo Kanner, addressing the thirteenth annual convention of the International Council for Exceptional Children, diagnosed various types of reading disability, and showed how the inability to read reflected upon the child's social and home life. The mixing of letters, the misapprehension of key vowels in reading and spelling activities, combined with normal progress in studies less dependent upon reading success, generally mark the child with dyslexia. Dr. Kanner concluded: "The great importance of recognizing and treating adequately the reading disabilities of children is quite obvious. It becomes especially clear if one learns that many of the patients with normal or even superior intelligence have been declared to be feebleminded. . . . It is necessary to explain the existence of the reading disability to the parents, the teachers, and the child himself. . . . In addition to the tutoring, other existing physical, emotional, and environmental difficulties must, of course, be straightened out."

English Community Undertakes Blindness Prevention.—The cost of providing for the 192 blind persons on the Register in Warrington (England) for a year was £7,210, a sum which did not in-

clude the cost of education, vocational training or old age pensions for the blind. Says the medical officer of health, G. W. N. Joseph, in his report to the county: "The only satisfactory and humane method by which it can be diminished is the cutting off of the source of blind people—by the prevention of blindness." Prevention of blindness activities which are being carried on in Warrington include antenatal work; organization for the care of cases of ophthalmia neonatorum; the services of health visitor and welfare centers in the care of the eyes of infants and small children; the supervision of the eyes of school children, including the vision inspection, treatment centers for minor ailments, spectacle registers, squint treatment, sight-saving classes and special schools for those whose vision is progressing towards blindness. Other services are available to adults through clinics, hospitals and the National Board for Ophthalmic Treatment. Further eye health services which need to be developed, according to the report, are a follow-up system; educational programs for industrial workers and for the general public; and a system of supplying specialists' services when they are needed to supplement and amplify the present voluntary services.

Eye Health Emphasized in Washington, D. C.—Eye health is counted among important public health problems in Washington by the subcommittee on conservation of vision of the Medical Society of the District of Columbia. Among aspects of eye health stressed in the report of the subcommittee are: extension of sight-saving class facilities; eye health supervision of school children, to include preschool vision testing, regular eye inspection during school years, and eye service to those children requiring special attention; prevention of eye accidents in play through eliminating toy firearms and toy explosives; and further education of the general public in matters of sight conservation.

Handicapped Children to Benefit in Illinois.—Recent legislative action in Illinois has created a state commission for physically handicapped children, to obtain and keep a register of handicapped children, co-ordinate all state activities that aim to benefit such children, and to promote voluntary work in this field. "For the purpose of this act," reads the law, "the term 'physically handi-

capped children' shall include all persons under the age of 21 years of age who, by reason of physical defect or infirmity, require special medical care, education and social service, and shall specifically include the crippled or deformed, the blind and those suffering of visual defect, the deaf and hard-of-hearing, the cardiac, the tubercular and those suffering of venereal disease." Estimating that there are fully 16,000 such children in the state, it is obvious that only the most effective programs of control with respect to the future prevalence of infantile paralysis, venereal diseases, tuberculosis, accident, and causes of blindness and visual impairment will prevent the constant addition of new victims to the list.

Occupational Diseases in Industry.—State legislatures have been adding in recent years to the list of just compensation causes those diseases known to be caused by special occupational hazards. Editorial comment in *Safety Engineering* calls attention to the preventive aspect of occupational diseases, a concern well in the field of the safety engineer's duty. Just as accidents have been dramatically reduced in many plants, through protection of workers and prevention of hazards, so occupational diseases may be reduced by eliminating some of the nine major hazards: abnormalities of temperature, compressed air, dampness, defective illumination, dust, infections, radiant energy, repeated motion, pressure or shock, and poisons. The Bureau of Labor's *Occupational Hazards and Diagnostic Signs* is a recent contribution to the subject.

Ampule for Silver Nitrate Developed in Michigan.—The ideal ampule for the silver nitrate solution used in prevention of ophthalmia neonatorum should have the following characteristics, according to the report made by the Bureau of Laboratories of the Michigan Department of Health: It should be made of a material not dangerous if accidentally dropped in the eye; it should be easy to handle so that the amount of solution administered could be controlled; it should be of such material that the ampule would not crack or crumble during use; it should have no deleterious action on the silver nitrate solution during the period that it is stored; and it should not be expensive. The Department of Health studied existing ampules, none of which approximated the ideal, and set about developing an ampule that would meet the requirements.

The resulting ampule, made by lining beeswax ampules with paraffin, has not yet been proven over a sufficiently long period of time, but it appears that silver nitrate will retain the characteristics of a fresh solution in these ampules from 10 to 12 times as long, at the relatively high temperature of 37.5 degrees centigrade, as it does in the old type of ampule. The equipment and method of manufacture is described in the July issue of the *American Journal of Public Health.*

Fireworks Study Seeks to Eliminate Tragedies of Fourth.—A nationwide study of the nature, causes and results of fireworks accidents was inaugurated on July 5 by the American Museum of Safety in co-operation with the National Society for the Prevention of Blindness and other public health and safety organizations throughout the country. The need for such a study is shown in the latest figures for New York City where 2,600 fireworks injuries were reported following the celebration of the Fourth in 1934, and in 1935 the number increased to 2,640. New York is one of the cities in which regulations and police ordinances prohibit the sale or use of fireworks within the city. The concerted efforts of health and safety organizations, as well as manufacturers of fireworks, will seek to control the hazards, and to eliminate them as completely as possible.

National Society Notes.—The Board of Directors of the National Society takes pleasure in announcing the election as honorary vice-presidents of the Society: Miss Lillian D. Wald, founder of the Henry Street Nursing Service; Dr. George S. DeSchweinitz, ophthalmic surgeon of world fame; and Dr. John H. Finley, educator and journalist, editor of the New York *Times*, and former president of the University of the State of New York. It is the Board's further pleasure to announce as members of the Board: Dr. Bernard Samuels and Dr. Walter B. Lancaster.

The deaths of Dr. Frank Allport and of Dr. William H. Wilder, members of the Society's advisory committee, are recorded with regret.

The Society's special summer activities have, as in the past, been concerned mainly with the training courses for sight-saving class teachers. Courses were given at Western Reserve University,

Buffalo State Teachers College, and Teachers College, Columbia University. Mr. Lewis H. Carris, managing director, visited the courses as special lecturer in sight conservation; Mrs. Winifred Hathaway, associate director of the National Society, was director of the course at Columbia. The 1935 summer session was the seventh year that training of sight-saving class teachers has been a part of the summer curriculum, and the number of students, not only at Teachers College, Columbia University, but at Western Reserve and Buffalo, established a new record. The enthusiasm of the seventy-six students who took the course bespeaks the growing demand for sight-saving classes in all parts of the country.

It is with great regret that the Society announces the resignation of Miss Mary Emma Smith, for five years its director of nursing activities, who leaves the Society to assume the directorship of public health nursing in the Bureau of Public Health in New Mexico. During her years with the Society Miss Smith has presented sight conservation and the prevention of blindness to public health and nursing groups. She has brought to the field of prevention of blindness an understanding of its relationship to the field of general health nursing, and takes with her a constructive program for sight conservation as a part of the state program.

Dr. Alix Churchill, associate secretary-general of the International Association for Prevention of Blindness, was guest of honor at a tea given her by the Board of Directors of the National Society. During her stay in the United States, Dr. Churchill visited New York, Buffalo, Chicago, Denver, Rochester, Baltimore, and Washington, D. C., in the interests of sight conservation and of prevention of tuberculosis.

The Twenty-Fourth Safety Congress and Exposition in Louisville, October 14–18, called by the National Safety Council, will consider the topic of safety in childhood; Mr. Carris will talk on "Safe Toys" at the opening meeting of that section.

The annual meeting and conference of the National Society will be held again at its headquarters in Rockefeller Center, December 5, 6 and 7. Among special conference topics will be Medical Social Service in Eye Clinics, Statistics in the Prevention of Blindness and, in conjunction with the American Museum of Safety, a further discussion of Fireworks Hazards will take place.

Current Articles of Interest

Prevention of Blindness, Edward Jackson, M.D., *American Journal of Ophthalmology*, August, 1935, published monthly by the Ophthalmic Publishing Company, St. Louis, Mo. In editorial comment, the writer calls attention to the group defined, according to the definition adopted by the American Medical Association, as the educationally blind; he points out the ophthalmologist's responsibility to keep as wide as possible for these patients the gap between the vision that they have and blindness. He adds: "Educational blindness is more common, more remediable, and therefore more important than economic or total blindness."

Protecting the Eyes from Harmful Rays, W. T. Cameron, *National Safety News*, June, 1935, published monthly by the National Safety Council, Chicago, Ill. Excessive exposure to infra-red or ultra-violet rays demands as much protection for the eyes as does the hazard of flying particles of steel or stone. The government, through the Bureau of Standards, and the Navy have set up definite standards covering the amount of absorption for protective glass, which protect the eyes of workers from over-exposure to infra-red and ultra-violet rays. Specifications for protective goggles for various light-hazardous operations are given.

Some Aspects on Work for the Blind, Edward E. Allen, D.Sc., *Teacher of the Blind*, July, 1935, published monthly by the College of Teachers of the Blind, Manchester, England. In contrasting and comparing efforts on behalf of the blind in England and in America, Dr. Allen stressed the importance of psychological understanding of the problems of blind persons, and reiterated the hope that schools and institutions for the blind would become less necessary as every agency promoted and made effective the prevention of blindness.

Communicable Diseases of the Eyes of School Children and Their Prevention, Frank P. Schuster, M.D., *Texas State Journal of Medicine*, July, 1935, published monthly by the State Medical

Association of Texas, Fort Worth, Texas. Grouping the communicable eye diseases as (1) conjunctivitis associated with the acute exanthemata—measles, scarlet fever, smallpox, and chickenpox; (2) trachoma; and (3) the acute conjunctival catarrhal conditions, the author finds that prevention of these diseases lies in annual preschool round-up and the prompt segregation of school children showing eye symptoms of conjunctival nature.

The Importance of Correcting Muscular Imbalance in the Relief of Asthenopia, Leighton F. Appleman, M.D., *Pennsylvania Medical Journal*, May, 1935, published monthly by the Medical Society of the State of Pennsylvania, Harrisburg, Pa. Latent hyperphoria is often undiscovered, leaving the refracted patient with unrelieved asthenopic symptoms. Correction of functional muscular abnormalities, based upon systematic exercise, is an important consideration in the elimination of visual discomfort.

The Evaluation of Serodiagnostic Tests for Syphilis in the United States, H. S. Cumming, M.D., H. H. Hazen, M.D., Arthur H. Sanford, M.D., F. E. Senear, M.D., Walter M. Simpson, M.D., and R. A. Vonderlehr, M.D., *Journal of the American Medical Association*, June 8, 1935, published weekly by the American Medical Association, Chicago, Ill. The purpose of the study was to determine the reliability of the several serodiagnostic methods used in the United States. The conclusions show that of relatively equal value to the clinician are efficient complement fixation tests and efficient flocculation tests as applied to either blood or spinal fluid specimens. . . . There is some evidence that a properly performed, highly sensitive flocculation test might be used as a routine for the purpose of excluding the likelihood of syphilis. If a negative result is obtained by such a method, it is quite likely that it will be negative by any other method. If the test yields a positive result, it should be repeated and compared with one or more highly specific flocculation or complement fixation tests.

Vascular Basis of Tobacco Amblyopia, Walter F. Duggan, M.D., *Archives of Ophthalmology*, June, 1935, published monthly by the American Medical Association, Chicago, Ill. Experiments by

workers outside the field of ophthalmology have furnished clinical proof that some persons are hypersensitive to a substance in tobacco other than nicotine. The results of the use of nitroscleran in the treatment of tobacco amblyopia are briefly reviewed.

Visual Allergy to Light and Intolerance to Light, Louis Lehrfeld, M.D., *Archives of Ophthalmology*, June, 1935, published monthly by the American Medical Association, Chicago, Ill. In a series of objective tests and through subjective choice, the writer found that tinted lenses permitted longer visual effort under high illumination than did the normal eye. "Just as the skin is sensitive to light," he says, "whether visible or invisible, most assuredly the neuroepithelium of the retina and its connecting links with the entire nervous system may under like conditions repel unwanted light and make the repulsion evident in a way that is broadly termed eyestrain. Tinted lenses of a color pleasing to the eyes and having a uniform transmission of all visible wavelengths which reduce intolerance to tolerance and subdue actual physical light allergy supply the remedy."

Artificial Fever Therapy in the Treatment of Corneal Ulcer and Acute Iritis, E. L. Whitney, M.D., *Journal of the American Medical Association*, May 18, 1935, published weekly by the American Medical Association, Chicago, Ill. Report of a series of 8 cases of corneal ulcer and 6 cases of acute iritis treated by artificial fever therapy in the Kettering hypertherm leads to the conclusion that prompt healing of some corneal ulcers after fever therapy is a striking fact; and that the production of artificial fever in acute iritis is of definite value.

Conserving the Sight, William F. Snow, M.D., *Commonhealth*, April–June, 1935, published quarterly by the Massachusetts Department of Public Health, Boston, Mass. Through prenatal care, prophylaxis of the eyes at birth, vision testing, sight-saving classes, and prevention of eye accidents, we can prevent blindness in many cases. While the amount of blindness in the world is diminishing, we cannot neglect any phase of the continued efforts to save sight.

Book Reviews

Cataract, Its Etiology and Treatment. Clyde A. Clapp, M.D., F.A.C.S. Philadelphia: Lea and Febiger, 1934. 254 p. Ill.

Until the writing of this book there has been no single publication, at least in English, which covers in detail, and comprehensively so, the subject of the normal crystalline lens and its pathological changes. With this explanation, the title of the book is not misleading in that the subject matter deals with embryology, with comparative anatomy and human anatomy, and with the physiology and chemistry of the lens and other related topics. Dr. W. H. Wilmer wrote the foreword, a brief presentation of the history and the interest which has appeared in the pathological considerations of the human lens. The author, who is associate professor of ophthalmology at Johns Hopkins, acknowledges indebtedness to Ida Mann for the chapter on "The Embryology of the Lens," and for one on "The Comparative Anatomy of the Lens."

The remainder of the book is divided into twenty-five chapters. The anatomy of the lens and its ligaments, its nourishment and its growth are well covered. In the section on physiology of the lens, the theories of accommodation are, perhaps, a little bit more briefly dismissed than the reviewer would like. Still, perhaps, in a work of this kind which is essentially the pathology of the lens, normal physiology may be abstracted to make possible a more detailed consideration of such closely related factors as the chemistry of the normal and of the pathological lens.

Seven chapters are given over to a detailed description of the pathology of the lens, to the congenital anomolies, and to congenital cataracts. The pathogenesis of cataract as it applies to traumatic cataract, secondary cataract, complicated cataract and senile cataract is discussed fully. The sections on congenital and traumatic cataracts are unusually good. The non-operative treatment of cataract with the various procedures practiced by various investigators and clinicians is also covered rather well. This is a question, in ophthalmology, too often passed over by the physician as of no importance and as bare of any fruitful results.

Under surgical treatment, the various procedures at the ophthalmologist's command are considered and presented in detail. The section on intracapsular extraction could be a bit more extensive. It seems as though this type of cataract extraction is steadily receiving a deserved consideration from many more men. The reviewer was glad to see that the author devoted as much space as he did to the post-operative care of the patient and to the care and treatment of post-operative complications. Too often these items are neglected and relegated to a position of secondary importance.

The book is a valuable addition to ophthalmic literature, not only for the student, but for the established practitioner as well. The figures in the text are numerous, some of them of interesting historical note, and all, with but few exceptions, truly illustrative. It is written encyclopedically with an adequate bibliography at the end of each chapter.

EDMUND BENJAMIN SPAETH, M.D.

PHYSICAL DEFECTS—THE PATHWAY TO CORRECTION. New York: American Child Health Association, 1934. 171 p.

Physical Defects—The Pathway to Correction is, in the words of the book, "a study of physical defects among school children in New York City, conducted by the research division of the American Child Health Association in co-operation with the Department of Health and the Department of Education; supervised by a special Advisory Committee; and financed by the Metropolitan Life Insurance Company," with the purpose of helping to indicate the way to more effective health programs in the schools.

In the first three chapters, the purpose of the study is discussed, the nature of a defect is defined, and the pathway toward correction under optimum conditions is outlined and graphically charted.

Appendices A, B and C give a brief statement of school health organization and procedures in the elementary schools of New York City, methods of measurements and other supplementary data.

Chapters Seven to Ten discuss the findings of the field staff in the following: defects in acuity of vision; dental defects; hearing defects; defective nutrition; school health influence on tonsillec-

tomy; the control of pediculosis; and achievement in health education of the selected fifth and sixth grades. The study makes its own determination of what are considered severely uncorrected defects. After these are decided upon, one hundred per cent of each type defect is carried graphically through the various stages of the corrective process, namely: record, conference, follow-up and appointment for correction. Reasons for deflection from this, the optimum pathway, are noted and the percentage of cases on which each member of the responsible school staff is in error. The percentage reaching the final step in the pathway, appointment for correction, is compared with the nation-wide norms in the study of 70 cities. At the end of each chapter, four or five constructive recommendations are made for more efficient routing.

In the final chapter, the specific recommendations for each defect are re-emphasized and the following five general recommendations are made:

"1. The available facilities both for follow-up and correction should be considered in determining the severity of a selection for follow-up.

"2. There should be accurate detection of defect cases with economy of effort.

"3. There should be rapport among all the school health personnel.

"4. The home visit should be backed by authority.

"5. Essential records must be kept alive."

In order to agree with these conclusions, it is necessary to keep in mind the subject of the study and its specified limitations; otherwise, preventive aspects of the health program might appear to be neglected. All might feel that there should be accurate detection of defects and are pleased to note some workable new methods.

It is good to note that the study makes clear in its interpretation of Recommendation 4, that it is not official authority that is meant but, rather, the fortification that comes to the nurse through a thorough knowledge not only of the nature of the defect found but of the child's school experience history as well.

On the whole, one is impressed with the meticulous detail, the clarity of arrangement and the time given to this study. In the methods used there are specific recommendations and conclusions

to challenge and to indicate the way to more effective programs in our more urban schools as well as the large city schools. Not only the health personnel but all school administrators and educators should be interested in its content.

HARRIET B. COOK, R.N.

Briefer Comment

SOCIAL WORK YEAR BOOK, 1935, Third Issue, Fred S. Hall, editor. New York: Russell Sage Foundation, 1935. 698 p.

Like its predecessors, the third issue of the *Social Work Year Book* is an encyclopedia of information on the wide field of social welfare. Each special service—adult education, blindness prevention, foster care for children, Negroes, public health nursing, to enumerate a few of the topics—is concisely described in Part I: An Authoritative Record of Organized Activities. Part II: Descriptive Directories of 990 Agencies Operating in the Social Field, lists pertinent facts about established organizations. The *Year Book* is of great value not only to those specially interested in its field, but also to those who are engaged in many other professions and occupations that come into touch with one or more of its many-sided activities.

THE 1934 YEAR BOOK OF THE EYE, EAR, NOSE, AND THROAT. E. V. L. Brown, M.D., Louis Bothman, M.D., George E. Shambaugh, M.D., Elmer W. Hagens, M.D., and George E. Shambaugh, Jr., M.D. Chicago: The Year Book Publishers, Inc., 1935. 621 p.

One of ten in a series of practical medicine year books, this compilation of abstracts of recent material is carefully selected and arranged for rapid reference. More than 300 of its pages are devoted to the eye, its pathology and treatment. Many of the references are of material published outside the United States, and are of special value to the physician who does not have ready access to foreign publications.

MEN, MIRRORS AND STARS. G. Edward Pendray. New York and London: Funk and Wagnalls Company, 1935. 339 p.

An informative, popular book, written by the science editor of the *Literary Digest*, about telescopes, the men who made them, and

what they found in astronomy through the development of telescopes. The chapter on "The Ancient Art of Glass Making" is particularly interesting to the student of refraction history.

An Experimental Study of the Effect of the Use of the Typewriter on Beginning Reading. Cecelia E. Unzicker, Ph.D. New York: Bureau of Publications, Teachers College, Columbia University, 1934. 95 p.

Ted and Polly: A Home Typewriting Book for Younger Children. Ralph Haefner; illustrated by Eleanor Osborn Eadie. New York: The Macmillan Company, 1933. 107 p.

Seeking to discover what effect, if any, the use of a typewriter has upon the speed of children's learning to read, Dr. Unzicker selected two groups of first grade children having similar school backgrounds. One group had opportunity to spend from 75 to 90 minutes a week at the typewriter; the control group spent that time in the activities of the ordinary school program. Basing instruction for the use of the typewriter upon exercises developed by Dr. Ralph Haefner, and similar in advancement and scope to the workbook *Ted and Polly*, the children received 75 formal typewriting lessons. Other work was occasionally done on the typewriter. At the end of the experimental period it was found, by tests and from teachers' estimates, that the pupils who used the typewriter showed a slight but constant superiority over the control group in learning to read; and that the children in the lower ranges of intelligence were those most helped in reading progress by the use of the typewriter. The important result of this study, in the mind of the director of the experiment, is not that typewriting promotes learning to read, but rather that typewriting as carried on in this experiment does not harm the reading of first grade pupils taught by the more progressive methods.

A beginning workbook for young children learning to read and to type at the same time, *Ted and Polly* relates typing activities to reading, spelling and written composition. The book is written entirely for the child; exercise pages are perforated so that they may be torn out and used directly on the machine; instructions are given for using, from the beginning, two hands for typing, preparing the child for later use of fingering. The illustrations for the

exercises and the simple narratives are educationally and psychologically sound. The author, Dr. Haefner, has experimented widely in developing typewriting instruction for primary and elementary school children.

American Association of Instructors of the Blind. Thirty-second Biennial Convention. St. Louis School for the Blind, June 25 to 28, 1934. 247 p.

At the biennial convention of instructors of the blind the experience of two years' work is reviewed. Of special interest to those interested in the prevention of blindness, in the 1934 convention transactions, was the report on "Uniform Statistics of the Blind." Round-tables on specific problems in the education of the blind covered not only the theory of education but the practical details in teaching and training of blind students.

Physical Findings Among Certain Groups of Workers. Henry D. Rempel, Harold S. Diehl, and Donald G. Paterson. University of Minnesota Employment Stabilization Research Institute, Vol. III, No. 7. Minneapolis: University of Minnesota Press, 1934. 23 p.

"Are physical defects more common in some occupations than in others? Is physical condition related to socio-economic status?" are questions that the authors have set out to answer in this study. Choosing groups of men in skilled trades, factories and clerical positions, they find that there are insignificant group differences in physical efficiency, and that intelligence is not a factor in causing or obscuring group differences. To determine whether there is a relationship between physical condition and industrial efficiency, the records of women clerks at the Minneapolis Board of Education were analyzed. Study showed that there is no close correlation between efficiency and physical defects, since the defects are found in about the same amount among the most and the least efficient clerks. However, there is a greater amount of subjective symptoms among the inferior clerks.

Twenty-Five Years After: Sidelights on the Mental Hygiene Movement and Its Founder. Wilbur L. Cross, editor. Garden City: Doubleday, Doran and Company, Inc., 1934. 564 p.

Marking the twenty-fifth anniversary of the founding of the mental hygiene movement comes this volume of testimonial letters

to its founder, Clifford Beers, commenting on the new hope that mental hygiene has offered to those mentally sick.

Eye Health Study of Texas School Children, J. Guy Jones, M.D., F. M. Hemphill, and Jeanie M. Pinckney. Austin, Texas: Bureau of Nutrition and Health Education, University of Texas, Extension Division, 1934. 82 p.

Following the suggested outline in "A Program of Eye Health in a School System," published in 1934 by the National Society for the Prevention of Blindness, an eye health survey was made among 5,748 school children in four communities in Texas. Efforts were made to discover those children with visual defects and pathological conditions, and to determine in what manner eye health might be improved. Finding that 15.6 per cent of the children have abnormal eyes, that natural lighting was insufficient in some parts of classrooms, and that artificial lighting was entirely inadequate in the majority of classrooms, and noting that the school administrators and teachers had a sincere interest in the eye health of their pupils, recommendations were made for the thorough organization of an eye health program, integrated in the school health program.

Contributors to This Issue

Grace Langdon, Ph.D., took her doctor's degree in nursery education, and is a specialist in the Emergency Nursery School project of the Federal Emergency Relief Administration. **Anette M. Phelan, Ph.D.,** staff associate in education of the National Society for the Prevention of Blindness, is interested in developing sight conservation programs among teachers-in-training.

Sidney J. Tillim, M.D., practising physician, spent some time in the Indian Service at the Eastern Navajo Agency in New Mexico.

Lewis H. Carris, LL.D., managing director of the National Society for the Prevention of Blindness, is well known to readers of the REVIEW.

The vocational future of sight-saving class pupils has been a subject of special interest to **Marguerite Kastrup,** sight-saving class teacher in Cleveland.

Among our book reviewers: **Edmund Benjamin Spaeth, M.D.,** is associate professor of ophthalmology at the Jefferson Medical College of Philadelphia; **Harriet B. Cook,** R.N., is educational supervisor of the Monmouth County Organization for Social Service in New Jersey.

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Popular Beliefs and Superstitions About the Eyes

Charles A. Bahn, M.D.

THE atom of truth in most superstitions probably accounts for the persistence of the human race in believing in them. Dr. Bahn discloses here many of those regarding the eye

MANY great medical discoveries and some of our most modern medical methods have been known in folklore for hundreds and even thousands of years. Apparently foolish customs may contain a grain of important truth which is based on keen observations of cause and effect and is responsible for their persistence.

Red Flannel and Smallpox

The modern physician does not prescribe red flannel underwear for smallpox patients, yet this was a popular remedy during several hundreds of years. Now, infra-red light applications are used to accomplish the same result more pleasantly and effectively. Both, however, are applications of the same principle, heat-light. Many of the world's greatest medical contributions have been essentially more efficient applications of fundamental truths contained in popular beliefs, which some observer was keen enough to see, intelligent enough to investigate, and persistent enough to reapply more effectively. For example, Jenner's discovery of vaccination for smallpox was only a more practical application of the then-popular belief that those who milked cows had the disease less often. Some great medical advances of the future will probably also grow out of important fundamentals hidden away for ages in familiar customs. Popular medical beliefs have existed as long as mankind and probably will continue—sometimes accomplishing good, sometimes harm, and usually neither.

The Blindness of Tobit

Peculiar coincidences are encountered in health superstitions and beliefs. The blindness of Tobit and its cure, as told in the *Apocrypha*, is an interesting example. Tobit, the father of Tobias, while reclining in the courtyard of his home, was struck in the eye by the excrement of a bird flying overhead. Blindness resulted. The recovery of his sight, as quoted from the book of Tobias, is even more interesting:

> Chapter 6, Verse 2: "When Tobias went down to wash himself in the Tigris, a fish leaped out of the river, and would have devoured him. The Angel of the Lord told him to take out the gall, and to put it up in safety." Verse 6: "Tobias asked the Angel what was the use of the gall." Verse 8: " 'As for the gall,' said the Angel, 'it is to anoint a man who has whiten in his eyes, and he shall be healed.' " Chapter 7, Verse 11: "Tobias took hold of his father and stroke of the gall in his eyes, saying, 'Be of good hope, Father.' " Verse 12: "And when his eyes began to smart, he rubbed them." Verse 13: "And the whiten fell away from his eyes, and when he saw his son, he fell on his neck."

Tobit's affliction would probably be recognized by the modern eye physician as an ulcer of the cornea caused by the pneumococcus, a germ often found after an injury of the eye by contact with something unclean. The coincidence lies in the fact that bile salts, which are contained in gall, are among the very few drugs which dissolve pneumococci. The use of this same drug for the same infection of the eye is the subject of very recent medical experiments. In short, this new discovery apparently dates back to the cure of Tobit.

Religion and Health

Quite a few popular beliefs, superstitions, and religious customs originated as hygienic measures enforced by religious leaders. Let us look upon all religions as schools of health and happiness—physical, mental and moral. On physical health largely depends mental and moral health. The devotion of Sunday, or one day in seven, to rest and relaxation is the best possible division of the

week, developed through the experience of billions of people over thousands of years. The Jewish proscription of pork was originally necessitated by trichinae and other parasites which infested hogs and affected the health of persons who ate pork. Though the cause has long ceased to exist, the custom still prevails. Likewise, the Jewish rite of circumcision materially reduced the frequency and severity of some affections to which tropical peoples are especially liable. The dietary and other restrictions of the Lenten season better fit the average person for the approaching hot summer. The care-free happiness of Christmas, which encourages good will among mankind, actually promotes health.

Health superstitions were based on the concept that good health, in one form or another, represented the blessing or good will of a deity. Disease or ill health, on the contrary, represented the anger of a god whose dictates had been violated; or, if evil was personified, the machinations of a devil or evil spirit. For example, the ancient gods of Yucatan included a "Lord of the Solar Eye," who caused any neglect on the part of his worshipers to be punished by disease or injury to their eyes. Christians of the Middle Ages also sought to protect their eye health, or to restore it, by calling upon Saint Clare, patron saint of the eyes.

Our modern conception of the same idea is that violations of fundamental hygienic laws will cause sickness in one form or another. In one case sickness follows the disobedience of religious dictates; in the other, sickness results from voluntary disobedience of hygienic laws formulated through experience.

Soap and Superstitions

The keen observation of cause and effect, and the sound psychology on which many popular medical beliefs and superstitions were based, actually accomplished very little because of one thing, the lack of cleanliness. Three of the major causes of blindness—gonorrhea, syphilis and trachoma—which have caused millions of human beings to lose their eyesight, are transmitted by uncleanliness. They are less frequent and less severe in nations where soap is most used for bathing purposes.

Among the ancient nations the cleanliness of the Romans was proverbial, a fact which probably aided the rise of Rome to power

by preserving the health and strength of her people. The remainder of the ancient world was not particularly interested in physical cleanliness. During the Middle Ages personal cleanliness was apparently a lost art, as illustrated by the astounding fact that Queen Elizabeth took a bath about once a month, whether she needed it or not.

Only in the past 75 years has there been even a slight interest in the details of disease prevention by physical cleanliness of both persons and surroundings. Mental and moral cleanliness has always received much attention in popular beliefs and superstitions, but physical cleanliness was usually sadly neglected. In many medieval ocular remedies chastity and piety were considered essential. Both tended to increase bodily resistance through moral hygiene and also to reduce syphilitic and gonorrheal eye diseases.

Soap and superstitions don't go together. The nations who pay least attention to physical cleanliness have the most superstitions. The same emotionalism which has accomplished so much in the world of art easily lends itself to belief in the fantastic, and is often not accompanied by a correspondingly strong urge for the use of soap.

Fear and Disease

Popular superstitions and beliefs usually contain a mental and a physical factor. The mental part increases the individual's confidence in recovery and his urge to get well. A panicky fear is now no more conducive to health, happiness, or the recovery from disease than it was five thousand years ago. Germs have probably shortened fewer lives than panicky fear. Observant leaders of all times have used the best means at their command to overcome this state of fear in their followers and to foster it in their enemies.

Action and Reaction

Action of some sort is usually necessary for accomplishment. Mere thought is not sufficient. In some instances popular beliefs were originally based on observation, which, correctly or incorrectly, correlated cause and effect. In others, the performance of some unusual act which had no relation to cause and effect

simply increased the individual's confidence in recovery and thus augmented the urge to get well. Participation in group ceremonies has always played an important rôle in religion and emotion. The operation of the Chinese prayer wheel represents the last word for those in whom this mental attitude can thus be aroused.

Myths About Eyes

Through all mythology the eye has been held in reverence as a symbol of the all-seeing god. The Egyptian symbol of their great sun-god, Ra, was an eye, indicating the power of vision and light. The Greeks worshipped the sun as the eye of Zeus, while the Norse peoples reverenced it as the eye of Wotan. Another of the protective Greek gods was Argus, whose eyes were the stars that never all closed at once. Classical myths also tell of the less benevolent giants, the Cyclops, whose single eyes carried strength and terror. The symbolism of the all-seeing eye, in one form or another, exists today, especially in secret organizations.

Belief that the sun is the eye of the universe persisted down to the seventeenth century. When sun spots were discovered, there arose great indignation at the thought that the eye of the universe should have so common an ailment.

A New Zealand legend tells that brave chieftains possess divinity which is contained in their eyes. A young warrior who slays a chieftain transfers that divinity to himself by gouging out and swallowing the eyes of his victim. The eye is also reverenced among some African tribes as the germ or seed from which the individual may be grown. Around this belief legends have been created telling of the restoration of a dead child by keeping its eye in water until the body was regrown.

Beware of the Evil Eye

Reverence for the unknown can easily be transformed into an unreasoning fear of anything that suggests it. The varied and almost universal superstitions which center about the evil eye are based on the simple fact that some persons express emotions strongly in their eyes and face muscles. Those who have much energy and self-control can, with a little practice, look others directly in the eye for an unusually long time, tending to frighten,

mystify, or dominate other personalities less gifted. Frequent mention is made in ancient and modern history, especially among emotional peoples, of death and disease caused by the glance or look of people who exerted an evil influence on others. In Africa, over a hundred persons were supposed to have been killed within a few years by the spell of such a person. The real story will probably never be known.

It is possible that the so-called evil eye was also attributed to those with all sorts of ocular disfigurements. Among the brunette people of the Mediterranean region the evil eye is supposed to be blue, while the blond races of northern Europe think of it as black.

Let us analyze a number of popular superstitions and beliefs better to understand why such apparently foolish means were used to treat eye diseases. In some seemingly ridiculous remedies the same fundamentals are employed which modern medicine now uses more effectively.

Why Have Styes?

Styes are small abscesses near the roots of the lashes and pain is caused by pressure on the nerves. Relief of this pain is partially obtained by the use of heat, massage or discharge of the enclosed pus. Rubbing the stye with a gold wedding ring in compliance with a current superstition supplies the warmth and massage. The ring itself may have the advantage of being smooth, moderately clean and possibly sacred.

"Take a pebble from a running stream and, after rubbing the stye with it, throw the pebble back into the stream." Here, massage with a smooth, clean object is recommended, and even a faint suspicion of surgical cleanliness is suggested in throwing the pebble away after using it.

"Rub a black cat's tail over the eye nine times to cure a stye." Again massage is suggested, although the outstanding feature in the performance of this unusual cure is the surprise of the cat, if not the patient. In the scuffle, which might easily ensue through the misinterpretation of motives, anything might happen to the stye. The tameness of the cat would seem a very important factor in the outcome of this treatment.

"Wear a nutmeg hung round your neck to cure a stye." The

only merit in this remedy is the stimulation of confidence in recovery. In a similar superstition of wearing asafoetida about the neck to prevent sore throat and diphtheria, there was, in addition to a possible mental benefit, a slight sensation of warmth and an odor which possibly out-stunk the sore throat.

"To rid yourself of a painful stye, go to a crossroads and turn around three times." Here, the performance of an unusual act in an unusual way illustrates how the urge to get well was augmented without apparent connection between cause and effect.

Pierce the Ears to Cure the Eyes

An old and interesting form of human adornment is the wearing of earrings, a custom prevalent especially among primitive people since time immemorial. Piercing the ears to supply support for this ornament involved the letting of blood, and gradually developed into a ceremony containing all the elements of awe and mystery connected with the drawing of blood. As a remedy for sore eyes, when the sufferer was an adult, its chief value was to increase confidence in recovery. In infants, the tears brought forth by the pain of the operation probably washed out any secretion which may have been present in the eyes.

Lemon Juice in Babies' Eyes

The use of lemon juice, freshly squeezed, to prevent or cure sore eyes in babyhood is still respected in rural sections of Spain and Spanish-speaking countries. While citric acid has no power to strengthen the eyes, as old wives and grannies believe, it has some caustic action. The remedy must surely have effectively followed the saying, "No pain, no cure." The same principle of weak caustic drops is the basis of Credé's method of preventing gonorrhea in the eyes of the newborn. In the latter, silver nitrate takes the place of lemon juice.

Boric Solutions

Boric solutions, as used in the eyes, probably have never killed a germ or cured an infection. If you doubt this, place a solution of boracic acid in the air a few weeks and watch it become cloudy from a fungus growth. The popular faith in the curative virtues

of boric solutions depends largely on the fact that plain water will burn in the eyes, but boric solutions will not. Because they are not irritating, they produce a relative sense of comfort, a fact which, during several generations, was taken to indicate healing and antiseptic qualities. Aside from washing out mucus, boric solutions have but little place in the cure of eye diseases except to augment the urge for recovery. The same applies to normal salt solution, and some other drugs which are used in many of the proprietary eye drops and washes on the market.

Bonfires and Flowers

In many remedies of the past the physical factor in health restorations was limited to participation in ceremonies of different sorts which, in reality, only stimulated the confidence in recovery and the urge to get well. A widespread European ceremony was the celebration of midsummer night with huge bonfires and flowers. It was believed that persons who looked at the fires on that night through the petals of flowers would be protected from pain or disease of the eye for the coming year. Staring steadily at the fire without blinking was supposed to strengthen the eyes and cure them of disease. In reality, the protection against glare afforded by the flower petals was slight, and staring at the fire was only foolish. Both are examples of the false reasoning which characterizes most superstitions.

Hocus-Pocus

As far back as the heyday of Babylon and Assyria, sore eyes were cured by magic. An incantation was repeated over a black and white cord in which "twice seven knots" were tied. The mystic number seven, the symbolism of the knots, the contrasting colors of the cord, and the awesome solemnity of the chant, all provided an impressive setting for the fundamentals of mental medicine—the confidence in recovery and the urge to get well.

During the Middle Ages, a similar "cure for sore eyes" consisted in wearing around the neck a clean sheet of paper containing a magic formula of meaningless Greek words. This charm was guaranteed, however, only if both charmer and charmed were "in

a state of chastity," the verification of which was difficult, if not impossible.

Cleanliness and Godliness

The miraculous healing powers of sacred springs have been believed in and reverenced for centuries. The Bible tells us that, in the pool of Bethesda near Jerusalem, an angel came down to trouble the waters, and the first blind person who bathed in the spring thereafter was cured of his affliction. Although cleanliness is an important factor in preventing disease, baths, especially in dirty water, are hardly curative of blindness except possibly in the temporary forms associated with mental disturbances such as hysteria.

Similar miracles of healing eye diseases have been reported in medicinal wells like the famous Thruston wells in Northumberland. The miserable taste and fowl smell of these waters possibly hastened the urge to get well.

A Modern Miracle

The current superstition that to look at a hundred-dollar bill will cure sore eyes is another example of mind over matter. The pleasant surprise associated with even looking at a hundred-dollar bill, if there are such still in circulation, gladdens the heart and probably lends luster to the eyes.

An Eye for an Eye

Remedies for sight deficiencies were often developed through an interesting process of reasoning. The owl is able to see in the dark. Man could not, but wanted to. In India, therefore, it became the custom to eat the eyeballs of an owl to see better in the dark. Similarly, in Brazil, dropping the fluid from the eyes of a particularly keen-sighted falcon into the eyes of a human being was thought to increase his keenness of sight.

Another similar superstition concerns the ocular healing powers of bezoar stones. These were supposedly found in streams and were believed to have fallen from the eyes of stags.

Gland Therapy of the Past

It is possible that the use of body substances for treatment of eye diseases originated from the association, first, of eye with eye and, later, of one part of the body with another. The use of secretions and excretions of one sort or another to cure disease in other parts of the body was frequent, and was probably the forerunner of modern endocrine therapy. Through the whole gamut of popular remedies and superstitions we find repeated use of all sorts of organs and fluids, both animal and human, to cure diseases of almost any part of the body.

Brains

In the Papyrus Ebers, written over 4,000 years ago, human brains were prescribed as follows for sore eyes: "Mix one half of a healthy human brain with human bones and with it anoint the eyes each evening. Dry and finely powder the other half of the brain and with it anoint the eyes in the morning." Aside from its impressiveness and the inference of intelligence, this prescription is most interesting because the brain used had to come from a healthy man who died violently, thus avoiding the possibility of disease transmission. At the present time, pituitary gland extracts of the brain are used in the treatment of eye diseases.

Milk and Saliva

Warm breast-milk was used by the ancient Egyptians, Hindus, and Arabs to cure eye diseases. No harm probably resulted to the eyes from the use of this secretion except for the delay in obtaining more effective treatment, especially in gonorrheal infections. It is warm, non-irritating, oily, and above all, reasonably clean.

Another secretion to which curative properties have been popularly and incorrectly given is saliva. In ancient Rome the daily application of a woman's spittle was used to cure sore eyes. Today, spitting in one's eye is justly a cause for war. The celebrated Saracen physician, Rhazi, recommended it to be dropped into the eyes after an operation. Early in the Middle Ages, the great Avicenna also prescribed this remedy. Even earlier, in Maori mythology, Tawhaki restored the sight of a blind woman "by

anointing her eyes with spittle mixed with clay and slapping them with his hand."

Although fresh saliva is warm, viscid and non-irritating, it unfortunately contains germs which, especially in a bruised eye, may cause permanent blindness within a week.

Urine and Gall

Probably no popular treatment in the world's history has done more harm than the use of urine in the eyes. Hundreds of thousands have probably owed their blindness to this home remedy which infected them with gonorrhea and other diseases. Tragically, most of them were infants. This treatment, unfortunately, fails to take into consideration that some of the most serious eye diseases are transmitted by contact with infective matter, especially urine. Without this knowledge, one can easily understand why fresh urine was used in the eye. It is warm, and does not burn like water. Only education about personal hygiene can eliminate such treatment methods as this which, unfortunately, still exist.

The urine of a faithful wife was recommended by the early Egyptian physicians as a remedy for sore eyes. Folk-tales tell of the enormous difficulty in obtaining usable material for this remedy!

Among the colorful characters of history, one of the most interesting was Pope John XXI who had previously been an oculist, a physician and a philosopher. He recommended, after the needling operation for cataracts, a collyrium made of human gall and infants' urine. If this was not successful, the patient was advised to look through dark-colored crystals. History tells us that this pope's life was suddenly terminated by the falling-in of the roof of his mansion at Viterbo and, in the light of modern science, his fate was not altogether unjustified.

Human, animal and vegetable gall are among the most persistent remedies for eye diseases mentioned in many countries, through many centuries, and in many books, including the Bible. Mental gall, popularly called audacity, is not mentioned, although it has always played an important rôle in mental medicine. The Greeks believed that bleared sight could be cleared by means of eagles' gall smeared on the eyes, while the Anglo-Saxons attributed the

same virtue to ox-gall. The Chinese still use ox-gall for this purpose. In ancient Rome, human gall was employed to cure cataract.

Gall contains tannic or gallic acid which produces an astringent or drying effect in the mouth, somewhat like green persimmons. Primitive people apparently inferred that it would similarly dry up eye secretions which are especially frequent among tropical peoples. Today, in the treatment of trachoma, astringent drugs, including tannic and gallic acids, are used, an apt illustration that some of the same remedies now employed were in use for the same diseases three or four thousand years ago.

Cause and Effect

Popular observations have led to beliefs which were sometimes correct and sometimes very incorrect. The superstition that an itching eye forewarns trouble often proves to be true because an approaching stye is frequently a signal of a lowered vitality which invites illness.

Less accurate is the belief that measles cause crossed eyes. Children frequently develop crossed eyes during the ordinary diseases of youth, or very shortly thereafter. Any slight illness will apparently cause one eye to cross if a child already has defective pulling power of the eye muscles, defective focusing, especially of one eye, or defective development of the visual part of the brain. All probably existed, separately or combined, since birth. Having done no very close visual work as yet, such children have often been able to keep their eyes straight. As soon as they begin to use their vision more closely, or vitality is lowered by any disease, such as measles, they can no longer bear the fatigue of seeing together with both eyes, and pointing them correctly at the same time. The better seeing eye is then usually pressed into service for more accurate vision, and the other eye points in the direction where ocular fatigue is least. Measles, therefore, is, at most, only an aggravating factor in crossed eyes.

That children outgrow crossed eyes is a fallacy. Crossed eyes practically always tend to become worse unless straightened by glasses, training or operation. The original reasons why one eye crossed continue to exist, so that the probability of both eyes seeing together and pointing correctly, unless properly treated, becomes

less with each succeeding month. The longer the eyes squint, the harder they are to straighten. In fact, some authorities say that, technically, squint is incurable after the age of six.

Eye Teeth and Eye Diseases

The upper second incisor tooth has been popularly called the eye tooth because it was thought to point most directly toward the eyeball. Contrary to popular belief, however, statistical information shows that it does not cause eye disease more than any other tooth, and, like all other teeth, will cause no eye trouble unless it is infected.

Weak Eyes and Chewing Gum

Another interesting popular belief based on an incorrect interpretation of cause and effect is that chewing gum weakens the eyes. Since time immemorial human beings have chewed gums of many kinds, for flavor, appetite, relaxation and beauty, if not for poise. Especially in the novice, prolonged chewing does tire the face muscles, the weakest of which are those of the eyelids. The arduous use of gum may therefore produce a slight sense of fatigue noticeable in the eyelids. When manufactured chewing gum first came into vogue parents fostered this popular belief to discourage its use among children.

Growing a Mustache

The old belief that growing a mustache cures weak eyes is still another case of coincidence misinterpreted as cause and effect. During adolescence, skin eruptions, including styes and other lid inflammations, are more or less frequent. The development of the beard or mustache marks the end of adolescence and the advent of maturity when some skin eruptions, including those involving the lashes, usually diminish.

Moonlight Blindness

Not many years ago night blindness was popularly believed to come from sleeping in the moonlight. People devoid of superstition thought it just happened. Now we know that it is due to poor ability of the eye to respond to light changes and has many

causes, ranging from food deficiencies to defective ancestors. Other causes probably remain to be discovered. Sleeping in the moonlight is not yet one of them, although the restlessness associated with sleeping in excessive light of any sort might aggravate night blindness previously existing in a hypersensitive person.

Glasses Do Not Weaken the Eyes

The popular prejudice against glasses, which is fortunately subsiding, is largely due to the inference of disability which they convey, the physical discomfort of wearing them, and the belief that glasses have often been uselessly prescribed. Unfortunately, this last accusation has been occasionally justified although its occurrence is rare.

Among the fundamentals involved in the large majority of apparently unnecessary and unsatisfactory glasses are: incompetent testing, poor frame fitting, failure to reduce the various factors which have caused the patient's eye symptoms, and, lastly, a lack of real understanding between eye physician and patient. The need and benefit of correcting lenses to the patient often depend, not only on accurate testing of the eyes, but also on a broad understanding of the individual's eye use. Some patients unfortunately seem to believe that all their ills will be cured by the purchase of a pair of glasses, which can be worn to advantage in a coat pocket, a lady's purse, or a desk drawer.

Correcting lenses place the focusing power, which should be inside, in front of the eyes. If this focusing power is necessary to increase vision or decrease eye fatigue and discomfort, proper correcting lenses are the only intelligent remedy. Glasses don't weaken the eyes. Quite the contrary.

Most persons who wear glasses do not require them permanently. When ocular fatigue is reduced sufficiently by the use of correcting lenses, or the irritability of the eyes previously aggravated by dysfunction elsewhere in the body is lessened, glasses can often be dispensed with entirely, or need be worn only during prolonged eye use.

After the age of 40, the automatic attachment of the eye camera usually progressively weakens, and glasses become necessary for close work. These, technically, have no connection with correcting

lenses which may be needed for distant sight. Different strength lenses for far and near use frequently become necessary, a difficulty which is met by using two separate pairs of glasses or double vision lenses, popularly called bifocals. Increasingly stronger glasses are usually required after 40 for close eye use, not because glasses weaken the eyes but because age continues to weaken the focusing attachment in the eye.

Eye-Bright and Elder Bark

Health superstitions have not been limited to natural substances of human or animal origin. Association remedies, such as eyeballs and eye fluids from animals, were matched in the use of plants such as the Euphosia, or eye-bright, which resembled the pupil of the eye. Its virtues for treating ocular diseases were once greatly praised.

Another plant, which has been held sacred for many years in almost all European countries because of its healing effect on the eyes, is the elder tree. Anointing the eyes with the green juice of the inner bark was also supposed to make it possible to spy on the secret actions of witches. It is a viscid, non-irritating substance which does no harm and no good. Its use in healing lotions for the eyes has been noted as recently as 1890.

Calabar Bean

Coincidences in the use of certain plants for eye treatment have occurred, connecting superstitious remedies with later, more scientific methods. The Calabar bean, for example, which was used in religious ordeals in Africa, is now employed as eserine, a highly important drug used in the treatment of glaucoma, one of the most serious eye diseases.

Seeing Spirits

The most widely used plant remedies, however, were those known as "witches' ointments," concoctions whereby the witch, magician, or medicine man tricked the mind and sight of his victim or even himself. Witches' ointments were employed to "see spirits." They contained aconite, belladonna, stramonium, hemlock, henbane, etc.—all powerful drugs capable of disarranging not

only the vision but the mind and body as well. These ingredients were mixed, of course, with such "mystic" substances as "the blood and fat of night birds," "baby's fat," etc., which lent impressiveness to the ceremonies of mixture but only irritated or infected the eyes. The drug which appears most frequently in these ointments is belladonna, or atropine, one of the important aids to modern medicine in the treatment of some eye diseases.

Bright Eyes

In bygone days actresses used belladonna or other dilating drops to change light eyes to dark by enlarging the pupils. Somewhat later, weak solutions of cocaine were used because they slightly reduced winking and thereby made the eyes appear brighter. At the present time, in the moving picture industry, less harmful drops are said to be used occasionally to relieve the eyes from intense glare.

Dilating Drops—When and Why

To determine the actual necessity for wearing correcting glasses, their proper strength, and everything else necessary to the cure of eye symptoms, dilating drops are often essential, sometimes advisable, and occasionally harmful. Only an eye physician can decide intelligently on the advisability of their use.

In the treatment of some eye diseases, such as inflammations of the iris, dilating drops may be necessary to prevent blindness. In other diseases, such as glaucoma, they may do great harm. Only a competent eye physician who understands their use is permitted to employ dilating drops. Those who are not legally allowed to use them have publicized their abuse, apparently to mislead the public and to create a false prejudice for personal gain.

In children, especially those with a tendency to crossed eyes, the use of dilating drops is imperative; in young adults they are usually necessary; and after 45, they are usually not needed to obtain proper glasses. To this general statement there are obviously many exceptions.

By enforcing eye rest for several days, dilating drops often hasten recovery, and reduce the temporary discomfort associated with new glasses. They are sometimes necessary to examine properly

the back of the eye where the first signs of many diseases of other parts of the body are sometimes found. In one patient of every three it is impossible to prescribe efficient glasses without the use of dilating drops. Eye physicians know when they are harmful. In eyes where their use can do no harm, and may do good through making possible the prescription of more efficient lenses and quicker recovery, there is but one intelligent answer: use dilating drops.

Motes and Beams

Foreign bodies do get into eyes and their prompt removal is imperative to the sufferer. Many popular methods of ridding the eyes thereof are in vogue.

Removal of a foreign substance from one eye by rubbing the other is a prevalent custom. Another much used procedure involves pulling the upper lid over the lower and blowing the nose. Both of these simple measures may dislodge small objects which are loose enough in the eye to be drawn to the corner. The suction in the tear duct associated with blowing the nose is relied upon to remove the mote from the eye. Usually such means are unsuccessful because the foreign body is lodged in the groove of the upper lid or adheres to the eyeball.

Another method for removing foreign bodies from the eye, according to current belief, is with the tip of the tongue. This remedy is as dangerous as it is ungraceful, because the germs in the mouth are often just the kind that produce the worst infections of the cornea, especially when it has been previously bruised by a foreign substance. Probably the greatest accomplishment of the National Society for the Prevention of Blindness is dissemination of the great truth that eyes should not be touched by anything that is not absolutely clean. The attempted removal of slight foreign bodies from the eyes, with subsequent infection from dirty hands, handkerchiefs, or instruments of different kinds ranging from toothpicks to finger nails, costs thousands their sight every year.

Another method of removing dust, cinders or other small objects from the eye is with a flax seed. Although foreign substances occasionally adhere to a flax seed, which is smooth, it is usually not clean and may cause infections of particularly serious forms.

Poultices of potatoes, bread, oysters or steak are favorite remedies for eyes and lids that have been injured by rough treatment. Black eyes, popularly called "shiners," are due to bleeding under the skin of the lid and, if uncomplicated, usually last about a week. They prove beyond doubt that two objects can not occupy the same space at the same time, especially when one is the eye and the other a foot. During the normal period of blood absorption, all the king's horses and all the king's men with all the poultices that have been devised can not change the normal evolution of red, blue, and blue green until finally the normal color is restored. Although hygroscopic solutions, like epsom salts, do draw water from the lids and some of the varied articles of diet mentioned as poultices act in this capacity, their lack of cleanliness increases the risk of infection, especially in already bruised surfaces.

Aggravation by wind and dust of the little red elevation at the nasal corner of the eye—called a pterygium—is popularly supposed to be an insect wing which has attached itself to the eyeball. These pterygia seldom grow far enough across the eye to obscure sight and can be removed with a slight painless operation. They are not to be confused with cataract, which is behind the pupil and more frequently impairs the vision.

Yesterday, Today and Tomorrow

Although we are living in a world where science has apparently become master, but little has been accomplished practically in defeating two of its greatest enemies. These are human gullibility and audacity, which have both played so prominent a part in the healing art. When searching for health, the urge to rely on the intangible is almost fundamental. It has been used constructively and destructively since time immemorial by those who professed to cure disease. The intelligent man of today does not wear a nutmeg suspended around his neck to cure styes; but the firms who sell electric belts, radium spectacles, eye exercisers, vitaminized eye salves, and falsely represented eye washes still do a thriving business even in times of depression. New methods of marketing the more passive confidence in recovery and the more active urge to get well are devised by each generation and usually dis-

carded by the next, if not before. For us, the methods now in vogue are apparently the best.

Through history, the confidence in recovery and the urge to get well have been linked with other fundamentals of health and happiness, with embryo medical discoveries of varying importance, and usually with crude or clever foolishness which obscured from the buyers' eyes the underlying principle of suggestion. The sooner human beings realize that premature blindness, death and disease inevitably result from misuse of the human body and mind, the sooner will ridiculous remedies cease to exist. A better understanding of the simple fundamentals of cause and effect in life is the beginning and end of the prevention of blindness.

A Course in Eye Hygiene and Sight Conservation in Sight-Saving Classes

Helen J. Coffin*

EDUCATION for the future, as well as for the immediate use of eyes, is a basic duty of the sight-saving class. This course is the result of careful estimate of pupil needs and graded capacity to learn

Introductory

Opinions differ as to just how a so-called sight-saving class functions in the conservation of sight. In this country a sight-saving class is considered to be an educational center for pupils with defective vision who are under expert medical care. These pupils may be classified in two major groups, i.e., those whose vision is low from various causes and who cannot be educated profitably in the regular classrooms with all the small print reading and the regular class equipment; and those who are myopic.

It has not been positively or scientifically proved how much, if at all, sight-saving class work has prevented or retarded the progress of myopia. Moreover, some cases of myopia prove not to be of the progressive type. There are data, however, which show that few children who attend a sight-saving class have the expected increase in myopia during their adolescent years. A little child who has a high degree of myopia, with or without normal vision, is certainly much better off from the standpoint of training in the proper use of eyes in a specially equipped sight-saving classroom under the direct teaching methods of a teacher who has made a special study of sight conservation teaching, and who knows how to adapt the school assignments to the visual needs of the individual pupil, than if he were in a regular classroom.

The aims of a sight-saving class, however, are not only to provide

* Deceased November 17, 1935.

excellent teachers and thoroughly equipped and scientifically lighted classrooms in order to educate the child with the least possible amount of eyestrain; but also to help the child learn how to conserve his sight continuously.

Children are admitted to sight-saving classes upon the recommendation of an ophthalmologist. His attention and advice for each individual case are requirements for attendance in these classes. The specially trained sight-saving class teacher follows up the recommendations of the ophthalmologist and adapts her teaching methods to fit the needs of each individual child. To the skill of the ophthalmologist and the techniques of the teacher there should be added the learning ability of the child. Through a course in eye hygiene and sight conservation the child may learn to share in the experience of saving sight. Such a course should in no way attempt to enter the physician's field of diagnosis and care, or to teach detailed ocular knowledge. It should give only the simplest facts and build up from these facts, attitudes and appreciations for the continued preservation of eyesight.

This program calls for the co-ordinated efforts of ophthalmologists, teachers, and pupils. We should include the parents, but unfortunately the child, rather than the parents, is likely to bear the responsibility for interpreting to his family his need for continuing his school sight-saving habits in suitable home activities. The co-operation existing between ophthalmologists and teachers, and a knowledge and understanding each of the other's field of endeavor, have been some of the outstanding features of sight-saving class work wherever these classes have been organized. If the co-operation of the parents and the child himself in carrying out the advice and the teaching of the ophthalmologist and teacher, respectively, could be gained, it would insure more far-reaching results of the training in sight conservation.

When sight-saving classes are first organized in a school system the co-ordination of their activities with those of the schools in which they are located, and the adjustment of the pupils within both the special group and the larger units of the school and community require all the time the teacher can spare from the preparation of the lessons and the teaching of reading, writing and other subjects. After a class is well started, however, the teacher should

consider how she can teach her particular group the wise practice of sight conservation habits and the hygienic use of eyes both in school and out.

The special objectives of a sight conservation course should be very clear in the mind of the teacher, and her teaching procedure should be carefully planned and adhered to, or else confusion will result and the outcomes be of doubtful, or even harmful, value. Among the outcomes of this teaching one should find certain attitudes. It is desirable that the child develop a wholesome attitude toward life; that he adjust cheerfully to his sight-saving class placement, and that he become a dependable "sight saver" at home. He must also know how to apply his information in life experiences, especially in choosing his play activities, his scheme for continuing his education, and his "jobs" or future career.

In Cleveland the teachers in the sight-saving classes have tried a plan for the past five years which has gradually evolved into the present course in eye hygiene and sight conservation. We are still feeling our way, not yet sure of the philosophy, the objectives, the procedure, or the outcomes which we are obtaining; but there has been some tangible evidence of gains on the part of the pupils in interest, appreciation, and attitude, and we are encouraged by these results of the teaching of this subject.

Reasons for the Course

Education is a means to a better living. It is recognized as something that should function in behavior (what one does) as well as in intellect (what one knows). Learning involves both knowing and doing and the school's aim is to build up certain desirable habits, attitudes, and appreciations which will make worthy citizens. The child acquires knowledge and develops certain skills through orderly and graded processes of instruction. By doing things the child is forming habit patterns which become an integral part of his personality as he grows from childhood to adolescence and adulthood. Unless consideration is given to the application of ideas and skills in life situations, education does not function vitally.

One of the general aims of education to-day relates to good health. While some of the other aims of education are less univer-

sal, good health habits and good health have indisputable values for all children. Before birth and until death health is a major factor in living. It affects personality, learning, and working. Children enter school presenting a wide range of individual differences, many of them traceable to health, or matters pertaining to physical traits, inherited health tendencies, congenital malformations of bodily structure, etc.

The schools have discovered that education for all calls for differentiated teaching methods and material if it is to meet the needs of all the learners. Outstanding among the differentiated types of education already provided are classes for children with the physical differences which most seriously affect their ability to learn, such as braille classes for those children who are blind, sight-saving classes for the partially sighted, and oral schools for the deaf and hard-of-hearing. The fundamental objectives of education are the same for all children, but the specific objectives for these pupils differ. Specific objectives for the partially sighted child should include those objectives whereby the child with seriously impaired vision may learn daily habits, useful skills, wholesome attitudes, and the continuous wise use and care of his eyesight. Sight conservation is an important part in the health program of these learners. They must not be permitted to acquire an education at the expense of eyesight, and when they leave school they should give evidence of ability to apply their knowledge and habits in their daily living. To this end, sight conservation for these pupils becomes a subject for educational as well as for medical treatment.

Sometimes people assume that schools have no interest in or responsibility for the behavior of children out of school. If the school does not aim to affect the child's living by affecting the habits and attitudes of the child out of school it is not recognizing one of its fundamental obligations and is not fulfilling one of its major objectives. A good sight-saving class teacher thinks not only of the methods of the classroom, where she is ever-watchful, but she knows something about her pupil's home environment, activities, and habits, and has some knowledge of and plans for suitable vocational objectives for her pupils.

It has been found, however, that the teaching of sight conserva-

tion is not effective unless recognized as a subject in the curriculum, and as such it is still in a tentative stage. Progress in medicine and surgery is dependent to a large degree upon experimentation, both in the laboratory and outside. Progress in education is dependent upon tentative courses and experimental methods of teaching. Not to recognize the need for this within limits in all classrooms would be as detrimental to progress in education as it would be to progress in science. The material for a new subject and the method of teaching it should be planned with a great deal of care and as scientifically as possible. It should be measured for worth-while values in terms of the child's needs. The best school curriculum to-day undergoes continuous change, and a course in eye hygiene and sight conservation may be expected to improve as more is learned of the needs of the children and of the outcomes desired.

Making the Course of Study

Prior to 1921, the Cleveland sight-saving classes had no very definite course of study in eye hygiene and sight conservation. The teachers of these classes were well prepared and each taught as much or as little as they might choose from a very brief outline. This covered mainly the structure of the eye and a few of the common eye diseases. The result of this informal teaching was overemphasis on certain points, repetition of the same information, as the child went from grade to grade, and in consequence an indifference often amounting to a dislike of the subject of eye hygiene. There was little evidence of the right attitudes, or of the application of sight conservation outside of school, and no indications of individual responsibility for sight conservation.

During 1929–30, a committee of six sight-saving class teachers representing the primary, intermediate, and junior high school classes, with the supervisor as chairman, commenced work on a graded course of study for sight-saving class pupils in grades one to nine, inclusive. The committee arrived at the choice of objectives for this course by a careful evaluation of all data collected from various sources, including an analysis of sight-saving class pupils' activities out of school, an analysis of sight-saving class pupils' needs, an expression of expert opinion from ophthalmolo-

gists and sight-saving class teachers, and an analysis of the sight-saving classroom habits of pupils.

The criteria upon which the objectives were selected were interest, usefulness, suitability from the point of view of pupils' learning capacity, and relatedness of the activities to the child's experience.

The committee agreed that the approach in all grades should be from the child's point of view and that the goals to be reached should be stated in terms of learning and doing.

The Plan

Since a sight-saving class is always made up of three or more grades, it seemed desirable to divide the objectives into three series each—for primary, intermediate, and junior high school groups, respectively. This provided for a rotation in the teaching of the series. The full course of lessons takes three semesters to complete. By repeating each series twice in each grade-group the new child is enabled to get information in the proper grade and the other children have some review. A choice in the sequence of the lessons in a given series is allowed and the individual teacher may select lessons which correlate with seasonal activities and classroom projects. Every teacher, however, must use the same series for her grade-group in the same semester and in the same succession.

The primary grade series emphasizes habit-forming activities, such as taking glasses off carefully, always wearing glasses if necessary, position of the book for reading, etc. The intermediate grade series emphasizes the simple facts concerning the physiology and structure of the eye and activities for sight-saving class boys and girls outside of school. The junior high school series emphasizes the application of habits and facts as related to the community and vocational adjustments of the pupil.

At first all the teachers were given the same lesson written out in full. This did not permit enough flexibility. Although the objectives remained the same it was necessary to develop different lesson units for each individual class. The same lesson was not always satisfactory even when presented to the same grades because of the difference in eye conditions and mental ages. Moreover, this subject is the teacher's opportunity to utilize skill and tech-

nique in teaching methods, and to enjoy the development of a subject which is her specialty. It must be emphasized, however, that no teacher can get successful results who does not prepare each lesson. The minimum time for the primary classes is twenty minutes, twice a week; for the intermediate, forty minutes, or two thirty-minute classes a week; and for the junior high school, forty-five minutes a week.

The Sight-Saving Council

As has been stated above, the committee wanted to make a course in eye hygiene which would function as a means of sight conservation both for the child's immediate and for his future needs. In 1931, one of the members of the committee suggested the formation of a sight-saving council as a means of motivating the study of eye hygiene and of creating an interest in and responsibility for sight saving. The conduct of this council as an integral part of our course has evolved by slow stages during the past four years. In spite of some difficulties in the practical operation of such a council, it has functioned in a very worth-while manner, not only as a part of our sight-saving course, but as a real factor in developing boys and girls with a wholesome knowledge of themselves and their abilities as well as their responsibilities and obligations to others.

The General Sight-Saving Council of the Cleveland Public Schools held its first meeting in November, 1931.* A constitution was written by a committee of pupils. Officers consisting of a president, vice-president and secretary were chosen from our student body and plans were made to have two meetings each year. In addition to the General Council, each sight-saving class organized as a sight-saving council with all pupils eligible for membership who subscribed to a sight-saving pledge and tried to live up to sight-saving standards.

Twice each year each class council sends two representatives to the General Council meetings, one meeting of which is a business meeting and the other one a program meeting. During the year the class councils work as committee members of the General Council Committees. They prepare something which can be con-

* Not to be confused with the Sight Saving Council of Cleveland, organized in 1934.

tributed to the General Council in the way of information, reports, or dramatic presentations. The reports stimulate interest and rivalry among the centers; they inspire pride and develop initiative for active participation in activities.

One of the outcomes of these programs has been a collection of sight-saving class material for the pupils to use for reference. Another is the interest the parents have developed, and the information which has been disseminated through the programs which have been offered to the parents and the public. Attendance in a sight-saving class becomes a privilege when it has so much to offer, and membership in a sight-saving council is an honor.

The class councils have permitted the pupils to learn how to conduct a meeting, choose officers, speak before others, and give schools programs for parents and visitors during Education Week. The attitude of many of the parents has changed as they have seen their children taking part before a group and talking in an impersonal and altruistic way about sight saving. Such lessons as the one based upon the objectives "To Know How Glasses Are Made," or "To Know What Games Sight-Saving Class Boys and Girls May Play with Safety" help to develop interest and appreciation on the part of parents as well as children.

The facts and information taught by the teacher in the eye hygiene lesson become the basis for carrying on the pupils' council meetings. If such a topic as "Care of Glasses" interests a class council they may work on a booklet describing and illustrating the history of spectacles. Such material when presented to the General Council at a semi-annual meeting has been carefully corrected and copied on the bulletin typewriter for reference material for other classes.

In connection also with the sight conservation work is the constant drive to prevent economic waste through broken glasses. There is an honor banner presented at each General Council meeting to the class which has the best record in the non-breakage of glasses.

Sometimes handwork is correlated with the sight conservation course and classes make puppets for a class council program. These may depict the activities of sight-saving class pupils out of school. A class has recently made large paper dolls dressed in the costumes

of the countries all over the world where sight-saving classes have been organized. In junior high school, current items, and news of prominent people in sight-saving class work, or in the prevention of blindness, appeal to the pupils in their council time. The teacher, of course, must read the reference information, but one child can prepare and present the topic to the whole group. The Sight-Saving Review and the *Sight-Saving Class Exchange* have furnished the teachers with excellent reference material for these short class council talks.

Conclusion

From the foregoing it is apparent that we are trying to study the child who obtains his education in a sight-saving class, including his physical and mental abilities, and his home and neighborhood environments. In the light of all of these conditions the school aims to fulfill its responsibility toward the child to the end that he may learn certain facts, acquire certain habits and skills, and develop certain attitudes and appreciations which will enable him to make satisfactory adjustments in the future as well as in the present. A boy or girl who has attended a sight-saving class should know that his eyes should always be cared for by a competent ophthalmologist, and that certain eye symptoms are warnings to seek such advice. The appreciation of prompt, expert medical attention, whether for himself or others, is an outcome to be obtained from the learning of a few facts concerning the physiology and structure of the human eye.

A boy or girl who has attended a sight-saving class should consider certain conditions and sight requirements when preparing for, or choosing work. He should be able to weigh these requirements against his individual condition and to know to whom to go for reliable guidance in making final decisions. To know what to look for in choosing work and what to avoid will help young men and women to get started in a career without the failures which lead to a sense of frustration and discouragement, to say nothing of preventing possible injury from excessive eye work and eyestrain.

Finally, the child who from kindergarten on has learned to know his limitations and has learned to make the most of all of his abili-

ties has a better chance, not only to protect his eyes, but to conduct himself in a perfectly normal and wholesome manner among his family and associates. The value of sight-saving classes would indeed be questionable if emphasis on sight conservation spared the eyes and spoiled the child. Sight-saving classes should aim to develop the whole child, and the teachers should respect the personalities of these children particularly as they develop into adolescence.

In the education of these children with their medical, vocational, and social problems, the schools need the advice of all of the experts in these various fields: the ophthalmologist, the vocational counselor, the psychiatrist, and the visiting teacher. With this advice a well-integrated curriculum for the visually handicapped child may be developed in which the teaching of sight conservation should contribute to the learner's ability to adjust to life's situations.

Relative Visibility of Print in Terms of Illumination Intensity

Matthew Luckiesh, D.Sc., and Frank K. Moss

HOW much light? What kind of light? are questions that interest ophthalmologists, school officials, business and factory directors—and parents. Because opinion varies widely, the REVIEW presents this as the first of a series of articles on illumination

HUMAN beings functioning as human seeing-machines are interested in three fundamental phases of seeing. These are the visual task, the eyes and the visual sense, and light[1] and lighting.[2] The latter phase is universally controllable for the purpose of improving conditions for seeing. It may be subdivided into three phases for analysis. These are quantity of light, quality or spectral character of light, and quality of lighting or distribution of light and brightness. This discussion pertains primarily to the factor of quantity of light since, for practical reasons at the present time, we are obliged to accept the spectral quality of tungsten-filament light whether it is ideal or not.[3] Also, we are obliged to accept general, diffuse lighting as a practical means of lighting most classrooms at the present time. In this manner the discussion is confined solely to intensity of illumination, which is always a factor of primary importance in seeing. Hence adverse factors[4] of lighting such as glare or high brightness-contrasts within the field of view are not considered since they are preventable.

The most obvious result of an increase in the intensity of illumination upon an object or visual task is the corresponding improvement in visibility. In addition, there are important psychophysiological phenomena concomitant with critical seeing which are observable only after a more or less protracted period of visual effort. It is only recently that the latter have been appreciated

and measured. Hence it is to be expected that lighting recommendations of the past have been inadequate since they were formulated from a viewpoint of vision rather than seeing. For many decades a science of vision has been developing but seeing involves much more than the conception of eyes merely as optical devices. It involves a consideration of seeing as an activity of the human being operating as a human seeing-machine in which stimulation and impression, efficiency and safety, strain and fatigue are vital factors. Thus light and lighting, as well as eyes and eyeglasses, are to be regarded as "tools" for seeing.

It has been definitely established that intensities of illumination as high as 100 foot candles* are desirable for such a visual task as reading ordinary black print upon white paper. This conclusion is firmly based upon the results of extensive researches pertaining to the psycho-physiological effects of seeing and is in harmony with philosophical considerations and experience. Some of the more important criteria which we have used for determining ideal intensities of illumination are summarized as follows:

Momentary Criteria of Visual Efficiency[5]—visual acuity; contrast sensibility; speed of retinal impression.
Integrative Phenomena[6, 7, 8]—nervous muscular tension; ocular muscle fatigue; heartrate changes, etc.
Philosophical Considerations[4]—evolution of the visual sense under daylight intensities of illumination.

Quantitative data related to these criteria are presented in Fig. 1. Thus visual acuity, as a primary factor in reading, increases from 100 per cent at 1 foot candle to 170 per cent at 100 foot candles. It is now known that intensities of illumination must be doubled in order to produce an obvious and significant improvement in the visibility of an object. In other words, foot candles must be increased in geometric ratio in order to improve seeing in arithmetic ratio. The failure to think of foot candle intensities in terms of a geometric scale usually results in over-estimating the value of a definite increase in the intensity of illumination. It is also evident from the data of Fig. 1 that 100 foot candles are desirable for read-

* The foot candle is the unit of intensity of illumination and is equal to the density of luminous flux upon a surface placed at right angles to the light rays at a distance of 1 foot from a light source of 1 candlepower. (An ordinary candle placed 1 foot from a surface will illuminate that surface to an intensity of approximately 1 foot candle.)

ing when the value of the lighting is appraised upon a basis of ease and comfort. Obviously, far lower levels of illumination would be suggested by a narrow consideration of mere ability to see. The goal of a science of seeing is to provide conditions for easy rather than barely seeing.

FOOTCANDLES FOR SEEING

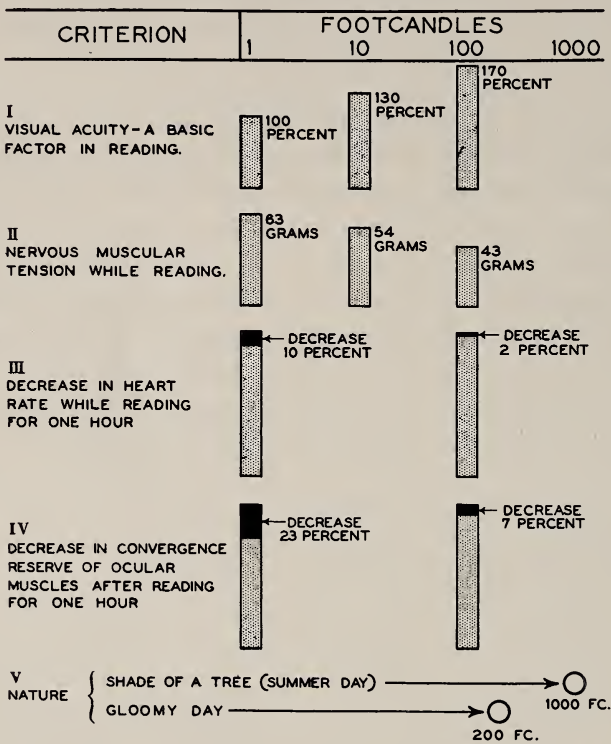

Fig. 1.—Fundamental criteria for appraising the relationship between intensity of illumination and ease of seeing.

By numerous and diversified researches we have definitely established the fact that the optimum visibility of details of a black object upon a white background is obtained under an intensity of illumination well above 100 foot candles. Hence any level of illumination which may be recommended for a particular visual task upon a basis of visibility data is usually a result of a com-

promise between visual and economic or engineering factors. Obviously, such a recommendation is not significant in an absolute sense. However, if a given intensity of illumination is considered to be acceptable or satisfactory for a certain visual task, it is possible to specify levels of illumination for other tasks upon a rational basis. This eliminates the prevalent empiricism, inconsistency and ambiguity in foot candle recommendations. A new instrument, designated as a visibility meter, is now available for this purpose.

This instrument, illustrated in Fig. 2, consists essentially of two

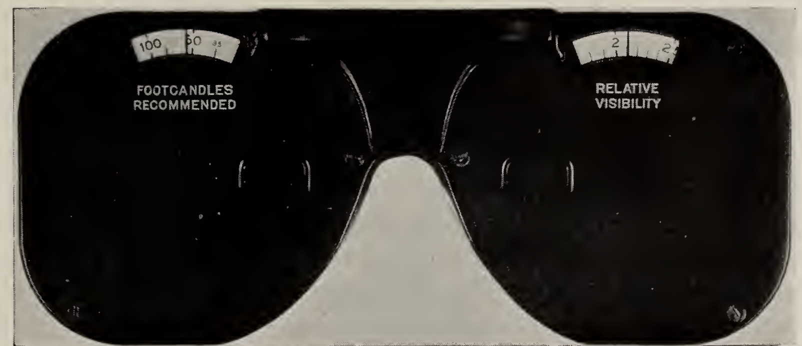

Fig. 2.—The Luckiesh-Moss Visibility Meter. A new instrument for appraising the visibility of various objects and visual tasks and for specifying practicable levels of illumination for visual tasks upon a rational basis.

colorless photographic filters with precise circular gradients of density which may be rotated simultaneously in front of the eyes while looking at an object or while performing a visual task. The observer holds the instrument in approximately the same position that eyeglasses are worn and, with a finger of the right hand, slowly turns a disk which rotates the circular gradients until the visual threshold or limit in the performance of the visual task is reached. Individual measurements of visibility may be made in a few seconds even by untrained observers. Obviously, the reliability of the results obtained with the Visibility Meter are proportional to the number of observations involved. Actually, in the measurement of visibility or of seeing, fluctuations in human variables necessitate a series of several observations for each observer.

The instrument has two rational scales which are based upon many years of research. These are: (1) relative visibility—scale range, 1 to 20, and (2) foot candles recommended—scale range, 1 to 1,000. In all the researches and calibration tests upon which these scales are based, subjects with average normal vision were used. Therefore, other factors being equal, the Visibility Meter is also a practical test of the part that subnormal vision may play in everyday seeing.

The visibility scale has an absolute rational basis founded upon the maximum ability of persons with average normal vision to recognize the details of a simple describable object of definite size and contrast. In an absolute sense a setting at unity on the visibility scale represents the limit of average normal vision under favorable conditions for seeing. The scale value "2" indicates that the object or task is twice as visible as the smallest object which can be recognized by persons with average normal vision. These scale values not only represent relative visibility of objects or visual tasks but also can be interpreted as factors of safety in seeing. Certainly there is a great need for introducing known factors of safety into seeing because of the great variation in the ability of a human seeing-machine due both to internal human conditions and external physical environment.

The scale values of recommended foot candles have no obvious relation to the scale values of relative visibility. The former are rational among themselves in a relative sense. However, the actual values are an arbitrary compromise between the foot candles necessary for barely seeing and the enormously higher foot candle levels for easiest seeing as indicated by our researches in seeing. That the scale of recommended foot candles is conservative is attested to by the fact that it is based upon the visibility of reading matter printed with 8-point (Bodoni) type and black ink on excellent white paper and illuminated to an intensity of 10 foot candles without any preventable glare present. This task corresponds to the scale value "10." Our researches in several directions have already indicated that at least 100 foot candles are desirable for that particular visual task. A scale value of "20" for another task under the same intensity of illumination as the former basic task indicates that it should have 20 foot candles in order to be as visible

or as easily performed as the foregoing standard task (8-point black print on white paper at 10 foot candles).

If all visual tasks are studied with the Visibility Meter at the standard level of 10 foot candles, the scale reads directly the recommended foot candles whose actual values are an arbitrary compromise between ideals and practical engineering and economic factors. In practice when the actual (A) foot candles on the task being studied differ from 10 foot candles, the scale reading of recommended foot candles should be multiplied by the ratio A/10 or 0.1A to obtain with sufficient accuracy the true value of our recommended foot candles for that particular task. Wherever practicable in studies of foot candle requirements for various visual tasks, a standard intensity of illumination of 10 foot candles should be used so that the recommended foot candles can be read directly from the scale. The basic principles underlying the scales of the instrument have been described in detail elsewhere.[9]

Since reading is a universal visual task and is the most common of the prolonged visual tasks of school work, a determination of the relative visibility of print of various sizes is correspondingly important. Although relative visibility may be expressed in terms of any one of the four fundamental variables of the visual threshold,[5] the factor of intensity of illumination is the most significant one, for present purposes, since this factor is completely controllable. Also, it is the factor in seeing which is usually inadequate in practice because lighting development in the past has not been based upon a science of seeing.

The relationships between type-size and intensity of illumination, for conditions of equal visibility, are presented in Table I for four usual sizes of Bodoni book type. The measurements were made with the Luckiesh-Moss Visibility Meter. The Bodoni type-face was selected for test purposes because of its prevalence in typography.[10]

The printed matter was placed at a distance of 14 inches from the eyes of the subjects and uniformly illuminated to 5, 10, 20 and 50 foot candles, respectively. These levels of illumination correspond to four different standards of "ease of seeing." A series of paragraphs printed in 6, 8, 10 and 12-point Bodoni type were read under each level of illumination. The subjects were instructed to

adjust the Visibility Meter, in each case, until the threshold or limit in ability to read the printed matter was determined. The intensity of illumination required upon the several sizes of type in order to produce conditions of equal visibility was then obtained from the scale of Recommended Foot candles. Since the instrument was calibrated upon the assumption of a definite type-size and level of illumination as a standard, the values indicated by the instrument required correction when the conditions under which the measurements were made were different from those adopted as standard.

Table I

Each intensity of illumination presented represents the mean of 90 observations obtained from 10 adult subjects possessing normal or near-normal vision.

	Foot Candles on Printed Matter			
Standard of ease of seeing	*12-point*	*10-point*	*8-point*	*6-point*
5 Foot candles on 12-point type...	5	7	10	17
10 Foot candles on 12-point type...	10	15	21	36
20 Foot candles on 12-point type...	20	28	42	68
50 Foot candles on 12-point type...	50	71	93	167

It will be noted that 6-point Bodoni type is as visible as 12-point type when the intensity of illumination upon the smaller size is about three and a half times that upon the larger size. In general, this relationship between type-size and intensity of illumination is independent of the standard of ease of seeing. Furthermore, deficiencies in type-size, at least for the sizes between 6-point and 12-point, may be compensated by increases in the level of illumination which are practicable from the standpoint of illuminating engineering.

Obviously, it would also be possible to investigate the relative visibility of various kinds of printed matter when the latter is viewed by subjects possessing various degrees of subnormal vision. For example, the relative visibility of text matter used in sight-saving classes and read by children with subnormal vision might be compared to the visibility of the usual textbooks when read by children of normal visual ability. Certainly the former class needs even more visual assistance, relatively, than the latter; and the

Visibility Meter technique offers a means for appraising these factors upon a reliable quantitative basis.

Obviously there are two cardinal intensities of illumination for any specific visual task. One is the very low level corresponding to barely seeing. The other is the very high level corresponding to easiest seeing. Certainly no one would recommend the former for general use. Only in recent years has science attempted to establish the foot candle levels for easiest seeing. However, we already know that, for reading, they are of the order of daylight intensities outdoors in the shade. In general this ideal can scarcely be reached in one step from present crude lighting practice. Therefore, the question arises, How large should the present step be? Various persons will weigh differently the various factors involved. Habit and narrow economics are generally over-emphasized. The cost of lighting must be evaluated anew in the light of the new knowledge of seeing and human welfare which alters past opinion of the value of good lighting and the cost of poor lighting from the viewpoint of conservation of human resources.

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The Causes of Blindness in Children *

Conrad Berens, M.D., C. Edith Kerby, and Evelyn McKay

THE direct relationship between causes and prevention of blindness is brought out in a factual presentation of findings made in 20 schools for the blind

A STUDY of causes of blindness in 2,702 children in schools for the blind, made by the Committee on Statistics of the Blind, is presented in the hope that it will stimulate medical research and that more reliable data will be obtained for use in the planning of programs for prevention of blindness.

The eye examination record form used in this study requires the minimum of medical data essential for the intelligent solution of problems relating to the child's education, vocational guidance and medical care, and for statistical purposes.

Importance of Etiology

The etiologic cause of blindness is stressed because the ophthalmologist usually tends to record his diagnosis in terms of the eye lesion only, even when he has determined the underlying etiologic factor. From the point of view of social programs, etiologic information is of paramount importance. A public health nurse or medical social worker may be of assistance in assembling known facts concerning a case.

If, at the time of onset of blindness, a complete summary of information concerning the case should be filed with the state commission for the blind or the department of health, valuable statistical data on causes and incidence of blindness would become available. This full information would also aid in plans for the child's welfare.

* Abstract of the paper presented at the Section on Ophthalmology, Annual Meeting of the American Medical Association, June 10–15, 1935; the complete paper is published in the *Journal of the American Medical Association*, December 14, 1935.

Age Group

The age group studied is about that usually found in elementary and secondary schools, hence only conditions occurring in children will be found.

Classification by Amount of Vision Remaining

Since no definition of blindness was found upon which ophthalmologists and workers for the blind throughout the country would agree, cases were divided into groups on the basis of visual acuity. Of these pupils, 12.6 per cent had vision better than 20/200, and about 4 per cent had better than 20/70, a degree of sight which is usually designated as the maximum vision for sight-saving class pupils. Pupils with too much vision for tactual training should be referred to sight-saving classes or the regular grades by ophthalmologists, who should also be consulted in adjusting the environmental conditions and teaching methods in schools for the blind to safeguard the remaining vision.

Classification by Cause

Data on causes of blindness are presented according to an etiologic and a topographic classification, the plan of classification being similar to that of the Standard Classified Nomenclature of Disease.

Etiologic Classification

Of the six main headings in the etiologic classification, the "congenital and hereditary" group accounts for more than half (51.1 per cent) of the total cases. There is need for further study to determine the etiology of congenital defects and methods whereby they may be prevented. Routine Wassermann tests would aid in making diagnoses of prenatal syphilis and study of family histories would indicate the definitely hereditary cases.

"Infectious diseases" constitute the second largest group (28.6 per cent). Ophthalmia neonatorum, with 10.7 per cent of the total cases, is deplorably high and indicates the need for continued preventive effort. The percentage due to syphilis (5.3 per cent) is believed to be greatly understated, due to incompleteness of the information on etiology. More routine use of Wassermann

tests and adequate treatment would prevent much unnecessary blindness.

"Traumatic and chemical injuries" are the third largest group (7.8 per cent). "Neoplasms," "non-infectious systemic diseases" and "toxic poisonings" occur very infrequently among children.

Topographic Classification

Affections involving the entire eyeball constitute the largest group of topographic causes (31 per cent). These are largely the developmental anomalies, the remainder being due to infectious diseases and trauma.

Affections of the lens (cataract 15.7 per cent and dislocated lens 1.4 per cent) comprise the next largest group. They are almost entirely congenital. Study of the case records shows that, except where the ophthalmologists are undertaking the corrective work voluntarily, recommendations for operations are, in many cases, not being carried out. This is due to lack of facilities for surgery, refractions, etc., and to lack of trained personnel for follow-up in the homes.

Optic nerve affections occur in 16.7 per cent of the cases. The etiologies of these cases are reported as "congenital and hereditary" in 42 per cent, "infectious diseases," principally syphilis and meningitis, in 27 per cent, and "neoplasms" in 9 per cent.

Among affections of the cornea, ulcerative keratitis (10.3 per cent) due chiefly to ophthalmia neonatorum, and interstitial keratitis (2.4 per cent) due to syphilis are most important.

Many cases involving affections of the choroid and retina were only indefinitely classified as to etiology. This group needs more research.

From this analysis it is evident that the assembling of sound and consistent statistical information on the causes of blindness in children may have considerable significance in shaping a program of preventive ophthalmology, in illustrating the effectiveness of preventive methods used, and for teaching purposes.

Conclusions

1. More ophthalmologic service is required for children in schools for the blind if much blindness is to be prevented and many

children are to be removed from the blind group and placed in the seeing and partially seeing classifications.

2. Public health nurses or medical social workers should be available to supplement medical service.

3. Continued effort should be made to reduce the amount of ophthalmia neonatorum.

4. Since the "congenital and hereditary" causes apparently account for over 50 per cent of the blindness in schools for the blind, it is imperative that more accurate knowledge of etiologic factors be secured as a basis for adequate preventive measures.

5. Because syphilis is specified as the cause in 5.3 per cent of the cases and is probably also responsible for a large proportion of the "congenital" cases, better methods of prevention and treatment of syphilis must be insisted upon.

6. Diseases of the choroid and retina will require much fundamental research before the etiology can be stated specifically and blindness prevented by direct attack on the underlying cause.

7. Although only 7.8 per cent of blindness was attributed to trauma, educational efforts and improved safety measures should be continued.

8. Because the visual acuity of the pupils was better than 20/200 (in 12.6 per cent) and was better than 20/70 in nearly 4 per cent, ophthalmologists should insist that more attention be paid to educational opportunities for children with serious visual impairment, but not actually or educationally blind.

These statistics on causes of blindness are probably better than those previously available. However, this study clearly indicates the need for the co-operation of ophthalmologists and all concerned with eye diseases and blindness in obtaining more reliable statistical information, especially in regard to exact etiology. We believe that the members of the Section on Ophthalmology of the American Medical Association will continue to co-operate as they have in the past.

Highlights of the Discussion

"Congenital and hereditary diseases present a different problem. There are too many instances where many children in the same family are pupils in the Blind School. Congenital cataract,

microphthalmos, uveal coloboma, dislocated lens, albinism and syphilitic eye diseases could all be decreased in numbers materially by a concerted personal campaign of education in these families, without requiring the legislative measures of birth control, sterilization and regulations against intermarriage. It is through ignorance that many of these families continue to bring blind children into the world, often against their will."—Dr. Albert D. Frost, Columbus, Ohio.

"While one of the chief purposes of this paper is to stimulate an effort to secure honest and reliable statistics concerning the etiologic factors that have to do with blindness, it also serves the purpose to illustrate the fact that much relative relief can be given to many who are included within the group regarded as blind, as this pertains to schools for the blind. On the other hand, nothing is more reprehensible to me than some of the unnecessary 'whittling' to which some of these children are occasionally and indifferently subjected."—Dr. Thomas B. Holloway, Philadelphia, Pennsylvania.

"Some two years ago four of us made a survey of the Illinois State School for the Blind . . . an admirable institution which has been going on without ophthalmological consultation for some little time. We found that of the 246 pupils in that school, 26 per cent were there unnecessarily, that their vision was of such quality that they could continue their education in the seeing world, or could be restored to the seeing world by simple remedial measures. Another 25 per cent we estimated could be restored to the seeing world by surgical remedial measures, and in the past two years we have tried to carry out those remedial measures. As a result we have decreased the population of the Illinois School for the Blind by about 40 per cent.

"To take up the space that was left there, the State Government very kindly gave us authority to introduce two sight-saving classes available only to children who live in communities that have no sight-saving classes of their own. . . . Although the expense of conducting these sight-saving classes is greater than the expense of conducting similar classes in the city, still it puts within the range of those who are not so situated as to be able to take

advantage of the sight-saving classes, the advantages of this education."—Dr. Harry S. Gradle, Chicago, Illinois.

"I was the originator of the definition which secures admission to the blind pension scheme, and it was an extraordinarily difficult thing to devise a practical definition. There wasn't any good saying that a person has one eye 6/60 and the other 6/30, because some of them might do very well and others with much better central vision and a limited field were much worse off than these people with good fields and 6/30. Consequently, the definition that we ultimately adopted was 'too blind to be able to perform work for which eyesight is usually essential.' "—Mr. Leslie Paton, London, England.

"One large group of cases that we immediately encountered (at Perkins Institution) were those who had been sent in with a diagnosis of congenital amblyopia. On more careful examination, it was found that a small group of these people had completely normal fundi. On going into the history of these patients, the interesting thing was found that birth injuries were associated with a great many. I believe that this immediately takes these people out of the classification of hereditary blindness and puts them into the classification of birth injuries."—Dr. T. Gundersen, Boston, Massachusetts.

"Of course I think we all recognize the fact that, from a financial standpoint, our states are responsible for this problem. . . . Active interest in the problem from a scientific standpoint has been definitely lacking. . . . Surely it is true that if we as ophthalmologists do not sponsor in an active way the problem that confronts these children, who in heaven's name will do it? I think that these blind schools sponsored and maintained by the states should be the active workhouse for this problem. . . .

"One other thing of interest to me is this problem of congenital blindness. I believe it can be solved when enough information is at hand to give positive advice as to the best way out. I know personally that in our schools in North Carolina over one-third of the population in those schools at the present time

are children whose parents, either one or both, attended a similar institution. I believe that these parents do not want to have these children, but they have not had any advice and naturally it should not surprise us to see from three to ten children coming into our institution from the mother who was educated there and married for her rightful companionship."—Dr. V. H. Hicks, Raleigh, North Carolina.

Editorial

Helen J. Coffin

THE death of Helen J. Coffin, supervisor of sight-saving classes in Cleveland, and contributor to this issue of the REVIEW, comes as sad news indeed to those who knew her personally and to those who knew her through her valuable contributions to the progress of sight-saving class technics. The REVIEW has always considered it a great privilege to be able to present Miss Coffin's articles, which are a living record of her directness, her keenness, her sincerity, and her idealism. The following tribute of Dr. S. H. Monson, of Cleveland, who was closely associated with her in her work, expresses the feelings of everyone who knew her, or of her:

"It was with a feeling of great personal loss that the many friends of Miss Helen J. Coffin learned of her death, which, following a brief illness, occurred in Cleveland on November 17, 1935.

"Since 1922 she had been supervisor of the sight-saving classes in the Cleveland Public Schools, which, under her able direction, have become recognized amongst the foremost in this country. Her intimate knowledge of the needs of sight-saving classes and the methods for teaching the children enrolled in them, was recognized and appreciated by those most closely associated with her in the work. No new method was adopted until it has been carefully considered and medical advice sought as to the possible harmful effect upon the eyes.

"Vocational guidance was a subject of great importance to her, and she followed with keen interest the lives of the children after they had left school and kept in personal touch with a great many of them.

"She took a great interest in the question of proper illumination and was a member of the Executive Committee of the Cleveland Sight-Saving Council. It was due in great part to her efforts that one of the first sight-saving classrooms equipped with high intensity lighting was installed in Cleveland. Lately she was devoting

considerable time to the study of the relationship of illumination to the size of type.

"By her graciousness and charm she endeared herself alike to her teachers and pupils, and her loss will be mourned not only by her friends but by all who have the interest of sight-saving classes at heart."

The Forum

THIS section is reserved for brief or informal papers, discussions, questions and answers, and occasional pertinent quotations from other publications. We offer to publish letters or excerpts of general interest, assuming no responsibility for the opinions expressed therein. Individual questions are turned over to consultants in the particular field. Every communication must contain the writer's name and address, but these are omitted on request

The Eye Examination in Industry*

Rehabilitation begins with prevention. Not only should examination be given before a man starts work, but periodic check-up, especially in certain occupations, should be made. The periodic check should be thorough. There is a difference between a casual and a thorough examination.

What should constitute a thorough eye examination? How thorough such an examination should be, would, of course, depend on the job. For instance, Dr. Hart E. Fisher of the Chicago Rapid Transit Company, examining the elevated lines' employees, makes three classifications: Class I—motormen, switchmen, signalmen, and towermen; auto truck drivers and motor bus operators; these all must have 20/20 vision without glasses in each eye, normal color perception, good fields and depth perception. Class II—conductors, regular and extra guards, etc., must have 20/20 in one eye, and 20/30 or better in the other eye, with normal color perception. Re-examination is made in both these classes every two years. Class III—station platform guards, crossing flagmen, shopmen, laborers; must have combined vision of 20/30, and not less than 20/40 in one eye without glasses, and normal color perception.

Each eye should be tested separately with the Snellen chart at a distance of 20 feet with good illumination—with and without glasses. If the employee cannot see the largest letter on the chart at the 20-foot distance, he should step toward the chart until he can see it. It should be seen by the normal eye at 200 feet distant. If he has to come to within 5 feet before he can

* Excerpt of the paper, "Rehabilitation After Injury to an Employee's Only Good Eye," presented at the National Safety Council Annual Congress, Louisville, October, 1935.

see it, the vision is recorded as 5/200. Usually, 20/200 is taken as industrial blindness. In some states, however, allowance is made for errors of refraction correctable with glasses. In these states I would not be industrially blind, as with my glasses I can read the 15-foot line of letters at the 20-foot distance (V. = 20/15).

To continue with the examination: notations should be made of asymmetry of the face, protrusion of one or both eyes, size, shape and reactions of the pupils, colors of the eyes, movement in all directions and in convergence, the condition of the lids and the lining of the eyes, and the presence of pus or mucus in their corners. In the interior of the eyes, the optic nerve head is noted, its color, shape and irregularities, and the vessels that pass from and to it. These latter are traced outward into the periphery of the retina. This can be satisfactorily done only with the pupils enlarged. The fields of vision or side vision is tested with a target and screen or perimeter. (See case report below.) The simultaneous use of the two eyes to perceive depth should be recorded, and the percentage of fusion noted.

Naturally each employee does not need such a searching examination. Many of these tests can be made by well-trained technicians with a reasonable consumption of time, and are of value to the doctors who must judge the fitness of the candidate for the job.

The reason I spend time talking of these things is that I do not want you to be satisfied with cursory examinations or a cursory explanation of a blind eye. Let me illustrate by citing an example: Mr. A. H. (14156), a man 45 years of age, seen September 14, 1933, had been working for one of the railroads near Chicago. He was struck in the back of the head while hanging on to a car and waving a lantern, about June, 1932. He was knocked off the car and rendered unconscious, and by accident found a few minutes later by the head light of an engine. He was examined three weeks later, and the central vision found normal in each eye. *No fields of vision were taken.* There was no evidence of syphilis, but the reflexes were slightly sluggish. Some 8 or 10 years before the Wassermann test had been reported negative. Three months after the accident, he got a cinder in the left eye, and found he could not see well with the right eye, since which time the right vision had become progressively worse. Twice during his first interview with me he strenuously denied ever having seen double, but later admitted that he had been seeing double for about six weeks. He denied infection, and all subjective and objective symptoms of syphilis. He used tobacco in moderation, smoking about one package of cigarettes a day.

His vision in the right eye was only hand movements at one foot. In the left eye, his central vision

was normal, but his fields were contracted to 70 degrees temporally, 40 degrees above, 50 degrees nasally, 50 degrees below, and colors within the 5 degree circle.

He had all the physical signs of tabes, a syphilitic infection of the brain and spinal cord.

I saw him again about six months later, at which time he could see light only in certain fields with the right eye, and count fingers at one foot in certain fields with the left eye.

In this particular instance it would have been very wise for the doctors to have taken the fields of vision and the muscle balance at regular intervals, before he was injured. Repeated Wassermann tests might also have been a safeguard, although one must not rely 100 per cent on the reports of the Wassermann test.

Thirty-five hundred dollars were paid by the company in compensation; $500 in doctor bills. This money could better have been spent in making thorough examinations at frequent intervals; it would have paid for a complete medical policy for the entire company for an entire year, and it would probably have saved the man's sight and his mind. As it is, the man and his dependents will be state charges for many years.

Many of the routine tests included in a survey can be made by well-trained technicians who have not had medical training. Surveys of employees cannot be properly evaluated by non-medical men for the simple reason that their education has been inadequate. Where it is desired to have a survey, and a qualified medical man is not available, one should get the next best, recognizing, of course, his limitations.

Recently I heard about an employee who got soap in one eye, and found he could not see with the other. The history was that, as a result of a slight blast of air from an air hose, the retina had become detached. After several operations the eye was removed. A report was never made of the contents of the eye. Two years later the man died of a brain tumor, the characteristics of which resembled very closely a tumor of the eye. In the meantime, the man had been paid for the loss of one eye. The point is this: there was undoubtedly a tumor (cancerous growth) in the eye causing the detachment of the retina which proper medical examination should have revealed. Had that eye been removed early and examined for cancer, suitable treatment could have been instituted at once and the man's life saved. The cheapest treatment of human ailments is careful management by the best doctors.

Glaucoma is a disease which is much more frequent in late life, particularly in those who are worried from one cause or another, or in those who have a family history of glaucoma. It is a disease which may creep on a person without any

warning, and so rob him of sight that one eye becomes industrially blind before he is aware of the fact. It seems to seek out the most valuable employees. Study of the fields of vision is of great importance in diagnosing this disease. Such safety measures reduce the need for rehabilitation.

Many other diseases, such as syphilis, retinitis pigmentosa, Bright's disease, diseases of the white cells and the red cells in the blood, blood vessel and heart diseases, etc., can rob a person of the use of one eye without the employee or employer being conscious of the fact. These employees are potential dangers, and great precautions should be taken with their remaining sight. Thorough physical examinations at frequent intervals will reduce accidents to the minimum. As a result of such examinations, employees may be better placed where they will not harm themselves or others. Early treatment affords the best chance of avoiding blindness and the resultant need for rehabilitation.

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Hereditary Blindness

Loss of sight which is attributed to heredity deserves serious and thoughtful consideration. Facts warrant the conviction that much might be accomplished were it possible to exercise control in this field. It is useless to point out that all hereditary difficulties could be eliminated in one generation if those predisposed towards blindness by their genetic constitution would refrain from marriage or from the bearing of children in whom the defects would be carried on either as recessive traits or as dominant characteristics. Without recourse to positive and drastic measures this goal can hardly be attained for an attempt to prevent merely by verbal appeal the marriage of, or bearing of children by the number of individuals concerned, would be as ineffective as it is simple.

But the reduction of blindness from hereditary causes lies within the realm of the possible and should be effected. We have now much information about hereditary blindness. Dr. J. Myles Bickerton stated in a paper read before the Eugenics Society in England in March, 1932, that "we know more about the hereditary diseases of the eye than about those of any other organ, and for the good reason that, being the most important and complicated of our sense organs, its slightest defects cause marked disturbances of functions."[1] He estimated that 24 per cent or nearly one quarter of all blindness could be prevented by the elimination of hereditary causes.

Not long ago Perkins Institution with the assistance of Dr. Clyde J. Keeler, research fellow in heredity in the Howe Laboratory of Ophthalmology of the Harvard Medical School, prepared for the Third International Congress of Eugenics an

exhibit showing the extent to which heredity apparently operates as a factor in the causation of blindness. Leading causes of blindness, indicated by Dr. Best[2] as probably hereditary because of the fact that those enumerated had blind parents, were selected for study.

From the material assembled it was estimated that cataract was responsible for over 50 per cent of the cases falling within this category, glaucoma for about 22 per cent, and optic nerve atrophy for about 17 per cent, and cancer and other neoplasms, myopia, amaurosis, hydrophthalmus, infantile glaucoma and retinitis pigmentosa accounting for the remaining cases. While Dr. Best admits that we cannot know with exactness just how much of this blindness is of a hereditary character, the causes enumerated account for slightly under 30 per cent of all loss of sight; "yet," he adds, "this portion presents a serious problem, and deserves full attention."[3]

As the major cause in this classification, cataract, an opacity of the lens, deserves first consideration. Preparation of the data for the exhibit involved a study of the Perkins records of the past one hundred years. Genealogies constructed on the basis of the study revealed startling evidence of the persistence of cataract through many generations. In one instance cataract was found in 24 of the 50 members of three families who had intermarried during five generations. Nine of these individuals attended Perkins Institution. Statistics presented by Best state that the hereditary influence of cataract is more marked among those of close relationship, and that the probability of its appearance in the child is 50 per cent when both parents are affected and 42.1 per cent when only one parent is affected.[4] While there is no remedy for simple cataract, operation involving extraction of the lens will in the majority of cases restore useful vision with the aid of glasses. Secondary or complicated cataract, however, responds very unfavorably to treatment.

Glaucoma, the second cause listed, is not a disease as such but is, as near as can be ascertained, a constant or periodic increase in intraocular pressure exerting a force on the optic nerve head hollowing it out in the form of a cup and eventually killing the delicate nerve fibers and destroying sight. If detected early enough, as is possible with acute cases but rarely with chronic ones, an operation may prevent the loss of vision. Glaucoma is transmitted through direct inheritance in greater proportion than through indirect.

Optic nerve atrophy, the third cause, often involves complete blindness through the degeneration of the optic nerve. Its elimination involves a knowledge and control of this degeneration. One form is known to be of a definite hereditary nature. It is also known that the

greatest proportion occurs through indirect inheritance. This portion is 38 per cent while direct heredity, with one parent affected, accounts for only 6.4 per cent.[5]

These three causes account for 23 per cent of loss of sight according to Dr. Best's figures.[6] To this per cent must be added the toll of blindness brought about by the other causes listed as probably hereditary in character. As each cause is under one per cent there is little need to give fuller thought to them here, except to affirm that all of these causes added together offer an abundant opportunity for the reduction of blindness through control.

Studies showing the action of heredity throughout many generations are numerous. Of 939 children for whom case studies were made from the Perkins records 275 or 29 per cent showed defective ancestry or had brothers or sisters who had defective vision. Census findings reveal that the percentage of blind individuals having blind relatives, parents or siblings, varies from 4 per cent to 30 per cent. The situation is further complicated by the fact that various forms of hereditary blindness do not manifest themselves until comparatively late in life, frequently after children have already been born. From these facts it will be seen that little can be done to alleviate conditions among those whose sight has been destroyed or impaired by hereditary causes. Another generation, however, can and must be protected by the adoption of preventive measures.

Eugenists have brought emphasis to bear on a comparatively new aspect of the problem of blindness which is full of promise. They would try to control the transmission of the factors which predispose individuals to the loss of sight. While several methods for the realization of the aim of eugenics present themselves, selective sterilization is claimed to be the most effective and the most humane. Knowledge of the difficulties encountered in attempts to secure legislation making this practice legal for such social handicaps as feeblemindedness, to say nothing of putting into action laws finally passed, leads to the conclusion that compulsory sterilization holds little immediate hope.

However, positive results might well follow the acceptance of the following pledge which has been recommended as a means of popularizing voluntary sterilization:

Realizing that I am handicapped by a hereditary condition of the eyes known as .... which condition has appeared in at least .... of my relatives, and further realizing the grave danger of transmitting my ocular condition to future generations, now therefore I, ... do solemnly pledge myself not to marry without first presenting myself for surgical sterilization.

I take this pledge of my own free will without reservation, to the end that I shall not be responsible for

bringing into the world other lives so handicapped as mine.

Signed....................................
Age...
Date..
Address..................................
Witness..................................

Control of the situation through discouraging marriage offers little positive hope. While there is a strong sentiment against intermarriage of blind persons, it is based more on economic reasons than on eugenic. As a matter of fact, there is no reason why a blind person should not marry unless the loss of his or her sight is due to a transmissible cause. In this respect schools for the blind have a direct responsibility. Children whose blindness is hereditary should receive full information concerning the transmission of constitutional defects so that on leaving school they will be fully aware of the factors which should be considered by them when they contemplate marriage. Even here control is gained not through the prevention of marriage but in avoiding the procreation of offspring.

The attention of those in charge of schools for the blind is brought over and over again to the many children who ought never to have been blind and to the families which by their propagation are steadily increasing the ranks of potentially blind individuals. A splendid opportunity for effective work here presents itself. Adequate records of children admitted to schools for the blind should reveal families having hereditary tendencies toward blindness. Timely action might well prevent the birth of more blind children in these families. Certainly the appearance in a school of the children of former pupils and of as many as four brothers and sisters should not be ignored.

Intelligent action would involve the development of a comprehensive program for field work with the full co-operation of state authorities. To some this suggestion might seem to indicate a willingness to fall short of the goal. But to arrest an evil before it has run its full course, while perhaps a poor substitute for complete prevention, is nevertheless a great step toward the attainment of our aim. If support for such an attempt were enlisted, we should feel inclined to attach major significance to it as one more index of the change of attitude from intolerable, passive acceptance of blindness to active interest and control of it.

Gabriel Farrell
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References

1. The Inheritance of Blindness, J. Myles Bickerton, F.R.C.S., *Eugenics Review*, 24:2, July, 1926.
2. *Blindness and the Blind*, Harry Best. New York. Macmillan Company. p. 60.
3. *Idem*—p. 78.
4. *Idem*—p. 65.
5. *Idem*—p. 65.
6. *Idem*—p. 60.

Note and Comment

Annual Meeting and Conference.—The annual meeting and three-day conference of the National Society for the Prevention of Blindness, which was held in the Society's headquarters in Rockefeller Center, December 5, 6 and 7, brought together with united aim workers for the conservation of sight, medical social workers, leaders in the field of safety, and representatives from the public health nursing groups from New England and the Middle Atlantic States. Representatives of various organizations registered as coming from Minnesota, Missouri, Canada, Michigan and Virginia. "Medical Social Work in the Prevention of Blindness"; "Prevention of Blindness Responsibilities of Official and Volunteer Agencies"; "The Problem of Fireworks Accidents"; and "The Influence of the Public Health Nurse in Preventing Blindness and Saving Sight," were themes of conference sessions. The papers and the discussion alike were marked by their high standards of presentation and vital contribution to the subject of sight conservation.

The pitch of the annual meeting was sounded by the stirring message of Helen Keller, honorary vice-president of the Society: "Let us hold on to our cause and our faith that there will be still more eyes with light in them. Let us face the prophetic night, the press of the tempest, threats of the foe, and push further in every field of effort and prevention. The reward of the struggle is immense, and man's cry for light will nerve us to greater endeavor." The forward path, pointed out by Mrs. Winifred Hathaway, associate director of the Society, leads to goals where no sight-saving classes or classes for the blind will be needed; to the abolition of industrial accidents; to the ultimate reduction of eye accidents at play. "Scientific Advance and Welfare Problems in Sight Saving" was the theme of the address given by Alphonse M. Schwitalla, S. J., dean of the St. Louis University School of Medicine.

For the benefit of those unable to attend, as well as for those who wish the record for further study and reference, complete

Proceedings of the conference and meeting will be published as a supplement to the REVIEW, in a coming issue.

British Ophthalmologist Retires.—Mr. Bishop Harman, consultant ophthalmological surgeon of the health section of the London County Council, has recently retired from active service. A tribute is paid his thirty years of service on the behalf of eye health of London's school children in the *British Medical Journal:* ". . . His reports on the causes of blindness and seriously defective vision were for a long time the most authoritative statistical data available. He is best known, however, for his work in connection with classes for the partially sighted; and the initiation and development of the system of special education for partially sighted children in London is due in large measure to his enterprise and foresight." Classes for visually handicapped children in this country, too, owe much to the inspiration and stimulus of Mr. Harman's work in developing special educational facilities for myopic children in Great Britain.

American Board of Ophthalmology Examinations.—The 1936 examinations for the American Board of Ophthalmology will be held in Kansas City on May 11, concurrent with the annual meeting of the American Medical Association, and again in New York, in October, at the time of meeting of the American Academy of Ophthalmology. All applications and case reports must be filed at least 60 days before the date of examination. Information and application forms may be obtained from Dr. Thomas D. Allen, assistant secretary, 122 South Michigan Avenue, Chicago.

Prenatal Syphilis.—The return to the current New York stage of Ibsen's *Ghosts*, a play dealing with the shadow of congenital syphilis falling upon the life of a young man, reminds those who have read or seen the play that such a sequence of events need no longer be, if the aid of medical science is called upon in time. When Ibsen wrote *Ghosts* over forty years ago the disease was recognized, but science had made little headway in finding ways to treat it; it was not until twenty-five years after the writing of *Ghosts* that the germ, spirochaeta pallida, was discovered; only in recent years

has it been known that treatment of the infected expectant mother prevents the disease from passing to the unborn child, and lays the "ghost" that haunted Ibsen's hero.

More and more communities are recognizing the public health responsibility of preventing congenital syphilis, and its sequelae of infant mortality, blindness, mental disease, etc., and are making it a project for direct and drastic attack. New York City has recently established a bureau in its health department whose sole concern will be the treatment, the cure, and the prevention of venereal disease, through establishment of adequate clinic facilities and through the promotion of public information as to treatment and prevention. The state of New Jersey has made public a study of deaths from communicable diseases in that state for 1934; typhoid, scarlet fever, measles, diphtheria, and infantile paralysis together caused 221 deaths; syphilis killed 324. The chart showing these figures carries the message: "Save Generations to Come from Syphilis. The above chart shows deaths in New Jersey during 1934 from various communicable diseases. No baby need be born with syphilis though the parents be infected. Every expectant mother should submit to a blood test early in pregnancy. Syphilis is preventable and can be cured. If you have a venereal disease, or think you have, consult your physician at once or inquire of your local board of health of the New Jersey State Department of Health for location of the nearest clinic."

The annual Regional Conference on Social Hygiene, under the auspices of the New York Tuberculosis and Health Association, will take place on January 15 at the Hotel Pennsylvania in New York City. The growing recognition of the importance of education and action in combatting venereal diseases is demonstrated in the large numbers of representatives from health and social welfare organizations from New York, New Jersey and Connecticut who annually attend these conferences.

Pipe Smokers Most Likely to Have Tobacco Amblyopia.—During the past 22 years the Royal Infirmary of Edinburgh, Scotland, has treated 1,856 cases of tobacco amblyopia—a disease that causes gradual dimness of vision with an increasing sensation of mist before the eyes. According to Dr. H. M. Traquair, ophthalmic

surgeon speaking for the Infirmary, nearly all of the sufferers were pipe smokers, snuff users, or tobacco chewers. In only a small number of cases were cigarette smokers affected. Fortunately, tobacco blindness is curable within a few weeks by stopping all use of tobacco.

Survey of Physically Handicapped in California.—Under the direction of the Bureau of Vocational Rehabilitation of the Department of Education in California, a study has been made that is of special importance to physically handicapped persons and to employers. The REVIEW interests itself in the findings made on the partially sighted person. In this survey, which included a thorough canvass of families and industries in 19 representative California cities, there were found among physically handicapped (who make up approximately three per cent of the total population), 11 per cent with partial vision or blindness. In the study of disabled persons employed in industry, which covered some 3,250 establishments with a total of 169,489 employees, there were found among those employed at least 2.3 per cent who were handicapped in some degree. At least 8 per cent of these 3,925 handicapped persons were either partially sighted, one-eyed, or blind. In general, it was found that physically handicapped persons have standard wages, nearly equal opportunity for advancement, and are successful at their work. An analysis of occupational possibilities further disclosed that for the partially sighted, 71 per cent of 14,460 jobs are theoretically open to them. "It is believed," says the *Survey*, in conclusion, "that as a result of the survey, a large number of employers have a far better idea of the efficiency and employment feasibility for the physically handicapped and many have already indicated willingness to employ disabled persons otherwise qualified for particular jobs."

A detailed study of the occupations now followed by visually handicapped persons, as outlined in the report of the study, *Census and Industrial Survey of the Physically Handicapped in California*, should be of special interest to teachers, parents and vocational advisers of sight-saving class pupils, although some of the findings are surprising. For instance, 18 partially sighted persons are employed as truck drivers. Selling and soliciting are positions

entirely compatible with a visual handicap, and, according to the theoretical possibilities, office work offers a broad field for the partially sighted.

Poor Illumination Found in Connecticut Clothing Factories.—Lighting conditions and equipment in 32 clothing factories, employing slightly more than 2,600 women and girls, were studied to determine the effect of light on the health and efficiency of women workers. Although meter readings were taken at a time of day that workers had maximum benefit of natural illumination, 91 per cent of the readings fell considerably below the 25 foot candle level recommended by the American Standards Association for sewing on dark cloth. On cloudy days, all readings fell below it. Nearly half of the readings, taken on sunny days, failed to reach even 10 foot candles. Not only was the lighting of the factories insufficient, but the fixtures—ranging from a bare drop light to lamps in tin reflectors—were poorly spaced, and productive of glare. In some cases workers had improvised shades; in one factory, girls said that they often sewed in the dark rather than endure the glare of the light.

Myopia Greatly on Increase Among Japanese Students.—The fact that myopia has been found to be increasing rapidly among Japanese school children and students—being found in approximately 35 per cent of students—has alarmed the medical and educational authorities in Japan. Seeking the cause of a nearly 100 per cent increase in the incidence of myopia in the past twenty years, authorities advance several reasons: one factor which may contribute to it is the smallness of type used in dictionaries and textbooks; because of limited educational facilities and increasing population, children over the age of ten are forced into keen competition for places in higher schools; it is believed that the present generation is constitutionally weaker than its predecessors; and observation proves that the old buildings that house schools are inadequately lighted. Others are of the opinion that the eyes of Japanese children are weakened in infancy when babies are carried about on the backs of maidservants, with their eyes exposed to the direct rays of the sun. The prevention and control of myopia

presents a challenge to Japanese ophthalmologists and health and educational authorities.

Hawaiian Appropriation for Sight Conservation.—"The Light in His Life," a cartoon depicting a blind man saluting the light that streams from a $20,000 appropriation of the Hawaiian legislature for the conservation of sight and the rehabilitation of the blind, drawn for the *Hawaii Hochi* by cartoonist W. E. Moran, calls attention of the Islanders to the new hope for the blind and the partially sighted. This sum, to be expended in the coming biennium, definitely recognizes the pioneer work which has been done in the past three years.

International Commission on Illumination Establishes Standards.—The committee on industrial and school lighting of the International Commission on Illumination, meeting in Karlsruhe, Germany, approved the following resolution: The Committee on Lighting of Factories and Schools adopts the following minimum illumination standards for school lighting and recommends the use of higher values in the interest of studying to improve well-being and assure the protection of eyesight:

A.—Sewing and designing rooms and rooms where fine work is done—on the work	10 foot candles
B.—Classrooms—on the desks and blackboards; study rooms and libraries—on the desks and tables; various rooms, sculpture studios, singing classes, laboratories—on the work; gymnasiums and recreation rooms for basket-ball, handball, boxing, wrestling, play rooms, swimming pools	8 foot candles
C.—Auditoriums, assembly rooms, cafeterias, and other rooms where pupils congregate for extended periods but do not have to work	3 foot candles
D.—Recreation areas, dormitories, stairs, corridors, and lavatories	2 foot candles

It was further recommended that while in the present state of knowledge it is necessary to base on practical experience the illumination values for different tasks, every effort should be made to develop the study of the relations existing between illumination, the functioning characteristics of the eye, and the facility of vision, in order to put the lighting codes on a scientific basis. Since light-

ing conditions influence considerably the precision as well as the speed of working it is desirable that in addition to the study of the relation between illumination and production, attention should be called to the measurement of the accuracy of the work, particularly if it is possible to increase further the accuracy for illumination values higher than those required for the maximum working speed.

Health and Employment.—What is the effect of unemployment upon health? Of health upon employment? In a study of profession, clerical, skilled and semiskilled workers, some of whom were employed, others of whom had become unemployed early in the depression, and others whose unemployment dated from the late depression period, a definite relationship between health—physical efficiency—and employment status was found. In concluding his account of the study published in the November 15 issue of *Public Health Reports*, Dr. Harold S. Diehl says: "The specific physical defects and diseases which bear the most definite relationship to the employment status in all or most occupational groups are defective vision, impairment of hearing, dental caries, gingivitis and pyorrhea, abnormalities of the locomotor system, and suspicious chest findings. . . . A study of the table of physical findings cannot fail to impress one with the great possibility of increasing individual health, efficiency and happiness by the prevention or correction of physical handicaps in the employed as well as the unemployed groups . . . Although it is difficult to generalize from the findings in such diverse occupational groups as the subjects of this study, the data seem to justify the following statements: (1) That individuals who are in good health and who keep themselves as free as possible from physical handicaps are less likely to suffer unemployment than individuals who are handicapped by physical defects; and (2) that employers could expect greater efficiency from their employees if provisions were made to discover and correct their physical handicaps and to keep them in better health."

Sight Conservation Advances in Ithaca Schools.—A series of faculty meetings among Ithaca teachers will consider the question of sight conservation, not only in the sight-saving class, but among

all of the pupils in the school system. Held in the sight-saving classroom, these meetings will present not only theory but show in practice the best seeing conditions and materials that minimize eyestrain. Lessons on lighting will be given teachers, who, in turn, may give to their classes a project in lighting and the use of the sight meter.

Movies and the Eyes.—Movies are harmless to healthy eyes, according to an inquiry conducted by the Italian Institute of Educational Films through questionnaires sent to 15,784 school children and to leading ophthalmologists. Nevertheless, to avoid eyestrain, certain rules are suggested: that attendance be limited to one hour at a time; that there be two or three minutes' rest every ten to fifteen minutes; that attendance be prohibited to children having uncorrected errors of refraction or muscle balance and to those whose corrected vision is 20/40. These suggestions for cinema eye hygiene might well be considered in the United States, where the Saturday afternoon offering at the local movie lasts four hours or longer. Eye hygiene, as well as programs, for children should be included in the study of motion pictures for children.

Help for the Cross-Eyed Child.—The cross-eyed child needs prompt, corrective treatment, say the Canadian National Institute for the Blind and the Canadian Council on Child and Family Welfare, in a joint publication prepared by members of the staff of the Ophthalmological Department of the Toronto General Hospital. The pamphlet emphasizes the points: What is a squint? What causes a squint? How should a squint be treated? and the parental responsibility for instituting prompt corrective measures.

Hazardous Playthings.—Both *Hygeia* and *Safety Education* for December add their pleas for safety at play by asking for the elimination from Christmas lists of playthings hazardous to the eyes. Says *Hygeia:* "The BB rifle has no place near the Christmas tree. Each year, following the holiday season, a number of children are blinded because a playmate with a BB rifle missed his aim. Any gun that is designed as a toy should be taboo. The popgun,

with its cork and string, looks harmless enough, but boys are not satisfied to shoot an object that is held in check by a string. They like to insert stones, beads or dirt. The bow and arrow should not be given to a small child. The dart is a dangerous object. It looks more like a weapon than a toy and can inflict as much damage as a hurled ice pick. Sling shots and blow pipes are also dangerous."

Good Light in Printshop.—While daylight is the most perfect illumination for the compositor's table, a plant running on three shifts cannot arrange to maintain daylight illumination for twenty-four hours. The use of indirect illumination, supplemented by a false ceiling above the indirect luminaires, gives the compositor a uniform illumination level of 25 foot candles, evenly diffused and without glare, says the *Kalends Pictorial* of the Waverly Press. This intensity, under artificial illumination, is sufficient to cast a slight shadow behind the letters for quick identification. On the subject of intensities, says the *Kalends:* "Much propaganda has recently been issued with the aim of making people intensity-conscious. Research seems to indicate that as much harm can be done by intensities that are too high as by those that are too low. True, daylight may measure several hundred foot candles, and daylight is ideal, but equally true, no form of artificial lighting yet conceived can come even close to daylight intensity without creating a condition of glare very bad for the human eye."

Special Spectacle for Bedridden.—The problem of amusing and occupying the patient who is confined to a supine position for long periods is particularly difficult since reading and handwork are nearly impossible, and entail a terrific strain upon the eyes. A special spectacle to enable these patients to read or pursue eye tasks with normal ease has been devised in England, according to a descriptive note in the *British Journal of Medicine* for August 10; the spectacle, weighing no more than the spectacle having cataract lenses, utilizes prismatic shields and mirrors, so that the patient, holding a book upon his chest, looks directly upward to the reflected image.

Premarital Blood Test Required in Connecticut.—Connecticut has joined the ranks of states requiring a Kahn or Wassermann

test for both parties applying for a marriage license. From January, 1936, all applicants for marriage licenses must be certified by an approved laboratory as to their freedom from syphilis. While this step does not completely protect the non-syphilitic marriage partners from contracting syphilis, it does make possible a great advance in public education by calling attention to the seriousness of the disease and to the possibilities of its cure.

National Society Notes.—The Board of Directors of the National Society is happy to announce the election as third vice-president of Mr. Preston S. Millar. Mr. Millar has served on the Board of Directors of the Society since 1915; he is president of the Electrical Testing Laboratories, and has been especially interested in scientific advancement in sight saving.

Mr. Lewis H. Carris, managing director of the Society, was a speaker at the annual Congress of the National Safety Council; he has accepted membership on the Executive Committee of the Child Education Section of the National Safety Council. At the invitation of the Tennessee Valley Authority, Mr. Carris attended health institutes in Knoxville and Clinton, Tennessee, where he spoke on the conservation of vision.

The Society announces the addition of Mrs. Francia Baird Crocker, R.N., to its staff as associate in nursing activities. Mrs. Crocker was supervisor of the department for prevention of blindness of the Missouri Commission for the Blind for five years.

Mrs. Winifred Hathaway, associate director of the Society, has talked to varied groups in different sections on conservation of sight for school children: to school nurses at Hackensack, New Jersey; to students at New York University; to teachers of the Hughes School in Syracuse, New York; to the Physically Handicapped Children Section of the Western Central Zone of New York State Teachers, at Rochester, New York, where she also talked at the state Demonstration and Practice School on "A Community Program for Saving Sight"; to the round table and annual meeting of the Illinois Society for the Prevention of Blindness, in Chicago; to the department of Special Classes, State Association, in St.Louis; to the Institute for Public Health Nurses under the auspices of the

Missouri Commission for the Blind, in St. Joseph; and at the Perkins Institution and Massachusetts School for the Blind.

Representing the Society at the Rochester Tuberculosis and Health Association's institute on conservation of vision, Mr. Louis Resnick, director of industrial relations, talked on "Eye Accidents at Work and at Play."

Mrs. Eleanor Brown Merrill, associate director, attended the meeting of the advisory committee for the summer round-up of the National Congress of Parents and Teachers, in Washington.

Field work will take representatives of the Society to Louisiana, Texas, New Mexico, Arizona, California, Missouri and Pennsylvania in the coming months.

Current Articles of Interest

Lighting the Rural School, Winifred Hathaway, *Public Health Nursing,* September, 1935, published monthly by the National Organization for Public Health Nursing, New York, N. Y. The problems of illumination in the rural school are sometimes complicated by lack of resources, yet the teacher and the school nurse have means at hand to improve lighting, through conscientious study and application of basic principles of illumination. Some practical suggestions are offered.

Turning the Light on Home Lighting, Hugh Grant Rowell, M.D., *National Parent-Teacher Magazine,* October, 1935, published monthly by the National Congress of Parents and Teachers, New York, N. Y. Because the scientific and hygienic principles of lighting, particularly in the home, are of fairly recent origin, most homes are poorly lighted for eye work. The author advises not only adequate light, diffused and without glare, but recommends that parents attend to the reading posture of their children to prevent eyestrain.

Ophthalmoscopic Appearance of the Nerve Head in the Newborn and in the Young Infant, Samuel Karelitz, M.D., and Peter Vogel, M.D., *American Journal of Diseases of Children,* October, 1935, published monthly by the American Medical Association, Chicago, Ill. The diagnosis of optic atrophy made on infants presenting grayish optic nerve heads after the first few days of life is likely to be erroneous, say the authors, who found that the optic nerve heads of all infants retain a grayish color over a much longer period than was supposed; in a series of 150 newborn and older infants, the pallor of the nerve head and grayness of the optic disk continued to be apparent through the third to the sixth month. In Negro children and in brunettes, the resemblance to the adult disk developed shortly after birth; in blonds and albinos, the pallor persisted over a period as long as six months. In a few closely observed cases, there seemed to be an improvement in vision with

the disappearance of the gray of the optic nerve, but there is insufficient evidence to prove a definite relationship.

Provisions for the Schooling of the Blind and the Partially Blind, Edward M. Van Cleve, *Archives of Ophthalmology*, September, 1935, published monthly by the American Medical Association, Chicago, Ill. When, in spite of ophthalmological skill and science, sight is lost or greatly impaired, the ophthalmologist must be ready to guide the patient into channels where the handicap is overcome by adequate education. The author, principal emeritus of the New York Institution for the Education of the Blind, describes the educational facilities open to blind children and stresses the importance of the ophthalmologist's knowing the routine of admission to schools for the blind and classes for the partially sighted.

Hereditary Cataract, Emanuel M. Josephson, M.D., *Eugenical News*, September–October, 1935, published bi-monthly by the Eugenics Research Association, Cold Spring Harbor, New York. Bilateral cataracts are found in almost half of the descendants of a woman having cataracts, through two generations; in a more affluent branch of the family, the cataracts did not affect the third and fourth generation. Cataracts developed at different ages, some before birth, and in the poorer members, continued to develop in adult life. From the evidence, the family has a predisposition to develop cataracts, and in individual members, the development has been precipitated by some environmental stimulus. Since the development is greater among poorer members of the family, a discussion of the rôle of food deficiencies, toxic conditions, and endocrine disease as stimuli for the development of cataract is of interest.

Illumination Intensities for Reading, Miles A. Tinker, *American Journal of Ophthalmology*, November, 1935, published monthly by the Ophthalmic Publishing Company, St. Louis, Mo. A survey of the evidence leads the author to the conclusion that there is nothing to justify the suggestion that 25 to several hundred foot candles of light are essential for efficient reading of legible print by those with normal vision. Indeed, low intensities are to be pre-

ferred where diffusion of light is poor. He recommends the following specifications for light intensities to fulfill the requirements of hygienic vision for the reading of legible print by the normal eye: 3–5 foot candles with direct lighting and poor diffusion; 5–10 foot candles with the combination of direct and semi-indirect illumination frequently found in homes and offices; 10–15 foot candles with the better degrees of diffusion found in a few homes and offices. "If glare is eliminated, higher intensities may be employed without harm," says the writer, "but also without practical advantage . . . Eyestrain will not be avoided, however, unless light is adequately diffused at these higher intensities."

Turning the Light on School Lighting, Hugh Grant Rowell, M.D., *National Parent-Teacher Magazine,* December, 1935, published monthly by the National Congress of Parents and Teachers, New York, N. Y. Suggestions for lighting the school room, for utilizing all the available daylight and supplementing it when necessary with artificial light, are offered by the physician to Horace Mann School. He makes special suggestions for painting, window shades, seating, and maintenance of equipment at its maximum efficiency.

Book Reviews

Characteristics of Dichromatic Vision, with an Appendix on Anomalous Trichromatic Vision. F. H. G. Pitt. Medical Research Council, Reports of the Committee on Physiology of Vision, XIV. London: His Majesty's Stationery Office, 1935. 58 p.

This report of the Committee on Visual Physiology of the Medical Research Council (British) is the fourteenth of a series of special reports and deals for the most part with studies of an investigation of dichromatic vision. It is strictly technical in character and abounds in formulae and graphs. It is a necessary supplement to the library of anyone seriously interested in color vision as, without doubt, it represents an authoritative contribution.

Ultra-Violet Therapy in Eye Disease. Frank W. Law, M.D., F.R.C.S. Foreword by Sir Stewart Duke-Elder. London: John Murray, 1934. 78 p.

The ophthalmologist interested in keeping up with the progress of modern therapy will rejoice in the appearance of this little volume. It is an effort to present secure data which are the bases for modern ultra-violet light therapy in diseases of the eye. Sections are included dealing with radium, X-ray and infra-red rays. The book is well planned, the language is clear, and the evidence presented is convincing. Throughout the work the reader is impressed with the fact that the author is not unjustly enthusiastic about his subject. He does not hesitate to stress the conditions in which the use of ultra-violet therapy has been unsatisfactory.

Atlas of External Diseases of the Eye. Humphrey Neame, F.R.C.S. Philadelphia: P. Blakiston's Son and Co., Inc., 1934. 110 p. ill.

This valuable little work is composed of a series of beautiful and accurate colored illustrations, together with a brief statement of the major characteristics of the condition described. The book is a distinct addition to any ophthalmological library and is of particular value as a teaching aid.

John N. Evans, M.D.

Briefer Comment

Principles and Practices in School Health Education. 1935. New York: American Child Health Association, 1935. 363 p.

A compilation of material, presented at the eighth conference on health education, arranged by the American Child Health Association at the University of Iowa, considers the health education problems of rural and urban school systems. Approached from many angles, attacked by authorities from many sections of the country, the presentation of health education in this symposium is a challenge and a stimulation to health educators everywhere.

Co-ordination of Effort for the Education of Exceptional Children. Bulletin 1935, No. 7. Compiled by Elise H. Martens. Washington: United States Government Printing Office, 1935. 82 p.

In this report of a conference called by the United States Office of Education representatives of agencies particularly concerned with the education and care of exceptional children have contributed to answer the questions: What are the major problems in which the Office of Education can be of assistance to representatives of the various groups of exceptional children? In what ways can representatives of the various groups of exceptional children be of assistance to the Office of Education? In what ways can the representatives of the various groups of exceptional children be of assistance to one another? How can the Office of Education and representatives in the field work together toward a better coordinated program for all groups of exceptional children? An appendix carries full description of the scope of national volunteer agencies concerned with the welfare and education of exceptional children.

The Effect of Lighting on Efficiency in Rough Work (Tile Pressing). Joint Report of the Industrial Health Research Board and the Illumination Research Committee. Medical Research Council and Department of Scientific and Industrial Research. London: His Majesty's Stationery Office, 1935. 12 p.

The Relation Between Illumination and Industrial Efficiency. I. The Effect of Size of Work. Joint Report of the

Industrial Health Research Board and the Illumination Research Committee. Medical Research Council and Department of Scientific and Industrial Research. London: His Majesty's Stationery Office, 1935. 14 p.

The investigation of the Industrial Health Research Board and Illumination Research Committee into lighting and efficiency in tile pressing has produced definite and striking results. The operation was chosen because it was rough work, of a simple, repetitive character requiring no fine perception of detail—the kind of work which, it is usually held, can be done in any sort of light. Two investigations were made under factory conditions . . . in both cases the shops had little daylight and poor artificial lighting at the beginning of the experiment. The artificial lighting was rearranged and subsequently increased in intensity, and records of hourly output were kept for before and during the alterations. The average output increased considerably with increased illumination at the lower levels and continued to increase, though slightly, at higher levels.

On the bases of these results it is suggested that an average illumination of at least three foot candles is a condition of efficiency in work of this type. (The existing levels at the working area in the two shops at the beginning of the experiment averaged between 0.5 and 1 foot candle.) . . . Detailed observations of the effect on the workers were not part of the experiment, but the investigators formed the opinion that psychological factors played an important part in the increased efficiency. It was found that although the workers had not previously complained of bad lighting, they welcomed the improvements and the pleasanter appearance of the shop which resulted.

The investigation to establish a scientific relationship between the size of work (i. e. the detail on which attention is concentrated) and the optimum illumination from the point of view of performance is also reported. It is the first of a series, and subsequent investigations are to be made into the effects of other variable factors, such as the rate of movement of the object, and the contrast between the object and its background . . . The results showed that the effect of size on performance is greater, at all illuminations, than is the effect of illumination at any size. . . . An obvious

practical application of these results is that, when a choice is possible, small work should be avoided. But in the majority of cases the problem is to determine the technical requirements of lighting at a given job, and here also the contribution is a valuable one. (Excerpt of a review article in *Industrial Welfare and Personnel Management*, September, 1935.)

Education of the Slow-Learning Child. Christine P. Ingram. Introduction by Elise H. Martens. Yonkers-on-Hudson: World Book Company, 1935. 419 p.

Planned as a text for courses in the training of teachers for slow-learning pupils, the material on the mentally retarded child and the dull-normal and borderline pupil offers practical suggestions for the experienced teacher of special children as well as for those who must plan a flexible program for physically handicapped children having varying degrees of intelligence.

A Study of Some of the Research Work Carried Out During the Past Five Years on the Distribution, Etiology, Treatment and Prophylaxis of Trachoma, Melville D. MacKenzie, M.D. Epidemiological Report of the Health Section of the Secretariat of the League of Nations, April–June, 1935. Geneva: League of Nations, pp. 41–78.

A review of the considerable progress of the past five years in the knowledge of the distribution, etiology, treatment and prophylaxis of trachoma. The material is abstracted from the studies of trachoma specialists in all parts of the world, including such men as MacCallan, Pilat, Morax, Gifford, Thygeson, Noguchi, Bengston, Olitsky, etc. An extensive bibliography covering the important publications in English, French, Spanish and German should prove of great interest to the student of trachoma.

The Hospital Almoner: Hospital Social Service in Great Britain. Prepared by a Committee of the Hospital Almoners' Association. London: George Allen and Unwin, 1935. 168 p.

Contributions from various fields of social service give a picture of the existing field of action in medical social service in England and suggest the future possibilities of the work. Of interest is the chapter on "An Almoner's Work in an Ophthalmic Hospital," which covers both prevention of blindness activities and care of the blind.

Current Publications on Sight Conservation

Note.—The National Society for the Prevention of Blindness presents the most recent additions to its stock of publications. Except for the more expensive ones, single copies are sent free upon request. Unless otherwise specified, they are reprinted from THE SIGHT-SAVING REVIEW. New publications will be announced quarterly.

184. **Popular Beliefs and Superstitions About the Eyes,** Charles A. Bahn, M.D. 20 p. 15 cts.

The atom of truth in most superstitions probably accounts for the persistence of the human race in believing in them. The author traces the foundations of many familiar superstitions about the eye.

185. **A Course in Eye Hygiene and Sight Conservation in Sight-Saving Classes,** Helen J. Coffin. 12 p. 10 cts.

Education for the future, as well as for the immediate use of eyes, is a basic duty of the sight-saving class. This course is the result of careful estimate of pupil needs and graded capacity to learn.

186. **The Relative Visibility of Print in Terms of Illumination Intensity,** Matthew Luckiesh and Frank K. Moss. 12 p. 10 cts.

How much light? What kind of light? are questions that interest ophthalmologists, school officials, business and factory directors—and parents. One of a series of articles on illumination.

187. **The Causes of Blindness in Children,** Conrad Berens, M.D., C. Edith Kerby, and Evelyn McKay. 8 p. 10 cts.

The direct relationship between causes and prevention of blindness is brought out in a factual presentation of findings made in 20 schools for the blind.

188. **The Eye Examination in Industry,** Thomas D. Allen, M.D. 12 p. 5 cts.

The need for complete eye examination as well as physical tests to be made at the beginning and at frequent intervals for the worker is demonstrated in this article.

189. **Hereditary Blindness,** Gabriel Farrell. 12 p. 5 cts.

What everyone should know about the transmission of certain diseases of the eye and causes of blindness to prevent the defect passing to coming generations.

D84. The Mechanics of Reading, James E. Lebensohn, M.D. Reprinted from *Hygeia*, November, 1935. 4 p. 5 cts.

Popular discussion of the ocular and mental interplay in reading, and suggestions for treatment of reading difficulties.

D85. The Causes of Blindness in Children, Conrad Berens, M.D., C. Edith Kerby, and Evelyn McKay. Reprinted from the *Journal of the American Medical Association*, December 14, 1935. 8 p. 10 cts.

Full report of the paper presented at the annual meeting of the American Medical Association, with discussion and charts.

Contributors to This Issue

Dr. Charles A. Bahn, who is a practicing ophthalmologist in New Orleans and president of the Louisiana Society for the Prevention of Blindness, is also a member of the Advisory Committee of the National Society.

The death of **Helen J. Coffin,** supervisor of sight-saving classes in the Cleveland Public School System, has robbed sight-saving classes of a guide and mentor, and members of her professional field of an experienced counselor.

Matthew Luckiesh, D.Sc., and Frank K. Moss, who collaborate frequently in books and articles on the subject of light and sight, are both members of the General Electric Company; Dr. Luckiesh is director of the lighting research laboratories in Nela Park, Cleveland, Ohio.

Dr. Conrad Berens is ophthalmologist of the Light House Clinic for Prevention of Blindness, and surgeon and pathologist of the New York Eye and Ear Infirmary; **Miss C. Edith Kerby** is statistician of the National Society for the Prevention of Blindness; **Miss Evelyn McKay** is social research secretary of the American Foundation for the Blind. All three are members of the Committee on Statistics of the Blind.

Book reviewer: **Dr. John N. Evans,** a faithful contributor of reviews to the REVIEW, has recently been appointed professor of clinical ophthalmology at the Long Island College of Medicine.

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